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VOLUME III ISSUE IX • Devoted to the 68XX User • September 1981

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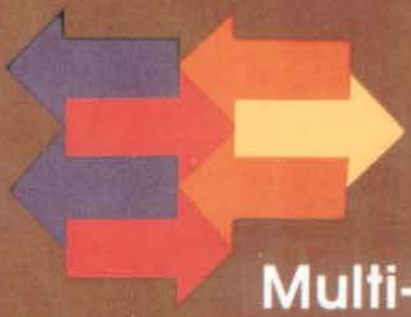
UniFLEX™

Multi-User

UniFLEX is the first full capability multi-user operating system available for microprocessors. Designed for the 6809 and 68000, it offers its users a very friendly computing environment. After a user 'logs-in' with his user name and password, any of the system programs may be run at will. One user may run the text editor while another runs BASIC and still another runs the C compiler. Each user operates in his own system environment, unaware of other user activity. The total number of users is only restricted by the resources and efficiency of the hardware in use.



Multi-Tasking

UniFLEX is a true multi-tasking operating system. Not only may several users run different programs, but one user may run several programs at a time. For example, a compilation of one file could be initiated while simultaneously making changes to another file using the text editor. New tasks are generated in the system by the 'fork' operation. Tasks may be run in the background or 'locked' in main memory to assist critical response times. Inter-task communication is also supported through the 'pipe' mechanism.

Support

The design of UniFLEX, with its hierarchical file system and device independent I/O, allows the creation of a variety of complex support programs. There is currently a wide variety of software available and under development. Included in this list is a Text Processing System for word processing functions, BASIC interpreter and precompiler for general programming and educational use, native C and Pascal compilers for more advanced programming, sort/merge for business applications, and a variety of debug packages. The standard system includes a text editor, assembler, and about forty utility programs. UniFLEX for 6809 is sold with a single CPU license and one years maintenance for $450.00. Additional yearly maintenance is available for $100.00. OEM licenses are also available.

FLEX™

UniFLEX is offered for the advanced microprocessor systems. FLEX, the industry standard for 6800 and 6809 systems, is offered for smaller, single user systems. A full line of FLEX support software and OEM licenses are also available.

technical systems consultants, inc.
Box 2570, West Lafayette, IN 47906
(317) 463-2502 Telex 276143

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'68' MICRO JOURNAL

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2-40 Track (48TPI) Double Sided	718,848	1,000,000	1348.00
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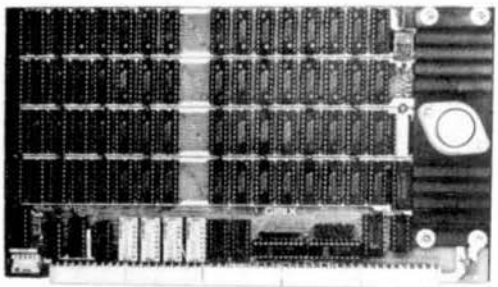

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NEW

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UniFLEX™

UniFLEX™ is now available for GIMIX™ SYSTEMS using the GIMIX™ 6809 CPU board and the GIMIX™ DMA disk controller with 8" drives.

see page 56 for more details on GIMIX™ disk controllers

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SEE GHOST AD PAGES 43-46-56

BASICØ9™ has a dual personality.

One craves meat-and-potatoes BASIC.

The other prefers Programme ala Pascal.

Some people say BASICØ9 is really a PASCAL in disguise, others say it's still BASIC. You'll understand this delightful dilemma when you look at both versions of the "bubble sort" program shown below: both can be run by BASICØ9. The program on top is unstructured and hard to understand, but it's traditional BASIC. The program on the bottom is well-structured and easy to follow, a virtue of PASCAL. With BASICØ9 you can program either way, or mix the best of both. It's like getting two languages for the price of one.

SORT AN ARRAY
IN ASCENDING SEQUENCE

```
90   DIM A(5)
100  I=5
110  IF I=1 THEN 200
120  FOR J=1 TO I-1
130  IF A(J)<=A(J+1) THEN 170
140  T=A(J+1)
150  A(J+1)=A(J)
160  A(J)=T
170  NEXT J
180  I=I-1
190  GOTO 110
200  RETURN
```

```
DIM array(5)
outer=5
WHILE outer>1 DO
  outer=outer-1
  FOR inner=1 TO outer
    IF array(inner)>=array(inner+1) THEN
      temp=array(inner+1)
      array(inner+1)=array(inner)
      array(inner)=temp
    ENDIF
  NEXT inner
ENDWHILE
RETURN
```

Makes programs better

BASICØ9 has five kinds of loop structures: WHILE . . DO, REPEAT . . UNTIL, LOOP . . ENDLOOP, FOR . . NEXT and IF . .THEN . . ELSE. If one of the five built-in data types (byte, integer, real, string, and boolean) doesn't suit the problem, you can make a new one of your liking with the TYPE statement. Need a tree, linked list, or symbol table? Complex non-rectangular data structures using any combination of data types are easy to define. Modular programming breaks down large programs to smaller, more manageable elements. BASICØ9 lets you create independent program modules called "procedures" with local variables for recursion plus parameter passing to any other BASICØ9 or machine language procedure. There is a complete set of statements for device-independent sequential or random I/O, plus a superlative PRINT USING system.

Makes programs faster

No full-feature BASIC for any 8-bit microprocessor is faster than BASICØ9, because it is an interactive compiler. As each program line is entered, it is instantly compiled to a smaller, faster form. Because BASICØ9 automatically converts programs back to original "source" form for listing, it is as friendly and easy-to-use as traditional interpreter BASICs. Each procedure can be independently compiled to position-independent, reentrant, ROMable format. Microware® developed a new ultra-fast 9-digit-accuracy floating point math system just for BASICØ9. And if that's still not fast enough, there's BYTE and INTEGER arithmetic.

Features that make programs easier to write

The compiler is integrated with a full-feature string AND line-number oriented text editor. If you make a mistake, BASICØ9 tells you instantly. String-oriented commands such as search, change, change all occurances, delete, and insert can be used on programs with or without line numbers. There's an automatic line renumbering function too.

Features that make programs easy to test

Debugging often takes longer than writing a program. That's why BASICØ9's integral high-level debugger sets it apart from all other compiled OR interpretive languages. The TRACE command shows you each statement executed in BASIC form, plus the result of any expression evaluation. STEP lets you run one or more statements at a time. LET and PRINT allow you to examine or change the values of variables, by name. STATE lists procedure calling order. And there are nine other debug commands. If you need to correct a program, you can edit, recompile, and rerun it in seconds.

Microware® software is available for most popular 6809 computer systems. Source listings and yearly maintenance update service are sold separately for most programs.

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Does timesharing on a small system make sense?

It does with OS-9™ Level One!

Now two (or more) acts can share your microcomputer stage. You will no longer have to walk away from your computer while it is busy running a long program. Because OS-9 is a multitasking operating system, you can be running a BASIC program while editing a PASCAL program, for example. This lets you make more efficient use of your time and your system, even if you only use one terminal. If your application requires multiple, independent terminals, one OS-9 system can do the work of several single-user systems.

The convenience of an advanced operating system

Sophistication does not require complexity. Many OS-9 users say that it is actually easier to use than the older 6800-type operating systems. Consider how easy it is to run multiple programs: to run a program you just type its name and hit 'return.' To run a program as a separate job, you type its name, an '&' character, then hit return. The program runs as usual, but OS-9 comes back immediately and is ready for your next command. Simple commands let you see each program's status, set its priority, or abort it.

The file management system has fast, byte-addressable random-and sequential-access files. The tree-structured multiple directory system lets you create separate disk directories for each user, project, or application. Command line I/O file redirection means you specify what device and/or files a program will use when you run it, not when you write it.

Efficiency and hardware versatility

No other operating system can run on such a broad range of hardware: the overall RAM requirement for Level One is 32K to 56K RAM. Memory utilization is superlative because OS-9 lets multiple tasks "share" the same reentrant program. For example, if two users run BASIC09, only one "copy" is actually loaded into memory. The Level Two version of OS-9 can utilize up to a megabyte of memory on systems having memory management hardware (both versions come with complete timesharing support).

OS-9's device independent I/O system can handle almost any number and combination of I/O devices: five or eight inch diskettes, winchester disks, disk cartridges, serial and parallel ports, memory-mapped video displays, and more.

Microware® offers a large selection of "stock" device interface software modules, or you can create your own; all the information you need is in the manuals.

Excellent support and documentation

Each OS-9 package comes with a User's Manual and a System Programmer's Manual that cover every aspect of OS-9. If you have special requirements, you can even purchase the Source Code for most of OS-9 and related software. At Microware® we take pride in offering the best customer support in the business. Technical advice and assistance by phone, mail or telex is available during all business hours.

Superb software tools

In addition to BASIC09, Microware® offers: an Interactive Assembler, Macro Text Editor, Stylograph Word Processor, Interactive Debugger, and coming soon, COBOL, PASCAL and C language compilers.

Microware® software is available for most popular 6809 computer systems. Source listings and yearly maintenance update service are sold separately for most programs.

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FORTH

FLEX COMPATIBLE FORTH

OS-9 VERSION COMING

SEPT 81

By Charles (Chuck) Eaker, Ph.D

"This is obviously the most comprehensive manual that's ever been produced on FORTH. It's vastly more complete than anything else! The way he talks about things is not only good reading, but he makes it easy to pick up on the first try."

Said Ron Anderson, '68 MICRO JOURNAL's contributing editor, talking about the X-FORTH manual.

X-FORTH is the best FORTH there is for 6809/6800 computers running FLEX! There's no better way to put it, X-FORTH beats the competition hands down and here's why.

FLEX COMPATIBLE
She can read and write FLEX random and sequential files.
She can even read and write the sequential files RANDOMLY!
Uses FLEX I/O for terminal and printer. Honors TTYSET.

TWO EDITORS
She has a TTY editor modeled after the FORTH INC. editor rather than the FIG version.
She has a FULL SCREEN EDITOR for terminals that support cursor addressing.

STANDARD ASSEMBLER
She uses standard MOTOROLA mnemonics thus:
'LDA [44]' becomes [44] LDA' in X-FORTH
6809 assembler also supports 6800 mnemonics!

ERROR CONTROL
You the programmer have complete control over disk related errors while other errors provide long error messages. X-FORTH has a protected dictionary and is very hard to accidentally crash!

FANTASTIC DOCUMENTATION (We're very proud of this)
4 Part Ring Bound Manual (over 400 pages!)

1... GOING FORTH
Tutorial on the use of FORTH that makes it a snap to learn!!

2... GOING X-FORTH
X-FORTH extensions and FLEX interface.
Shows you what the 'X' in X-FORTH is all about!

3... USER'S MANUAL, DOCUMENTATION AND GLOSSARY
This is the main part of X-FORTH with sections on: math operations, stacks, input words, output words, strings, disk I/O, edit, editor, assembler, utilities, etc. ALL grouped by function for ease of use! Glossary listing included with each section.

4.. GLOSSARY AND SOURCE LISTING
Glossary sorted alphabetically in addition to that in the users manual. Source of all but the core of X-FORTH (also included on disk!)

String primitives. Complete DATA FILE VOCABULARY. Triple precision math package. Portability between 6800 and 6809 versions of X-FORTH. Compatible with FIG FORTH. AND, THERE'S EVEN MORE WE DON'T HAVE ROOM TO LIST!

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- ROMable position—independent interpreter less than 1.2K long
- ROMable position—independent p—code
- direct interface to FMS routine
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- compiler runs in 16K with a single disk drive
- ideal for control applications
- entire run—time source available on disk

Price: Only $59.95. For run-time source add $30.00

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BY JIM SCHREIER

NEW

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THE BILL PAYER is a package of 10 menu driven programs in TSC Extended Basic. This powerful system helps you keep track of your bills. You can create a vendor list, enter invoices to be paid, generate reports about them, print your checks and much more. Uses random access files.

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INCOME/EXPENSE LEDGER. This valuable package is most appreciated at tax time. Allows up to 99 income and expense numbers. Ties into the PURCHASE ORDER system, and the Bill Payer.

Includes manual and source supplied on disk in TSC Extended Basic.

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Dataman

DATABASE MANAGEMENT

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You can create databases and do maintenance. Report writing is easy with both vertical and horizontal formats. Both 80 and 132 column reports are supported in the horizontal format. Formats are saved with run time options available. Label printing is made easy with up to 3 easily changed label drivers on line, and as with other DATAMAN output programs, the output can be spooled to disk for later printing. A statistics package gives up to 24 statistical values. You can transfer records from one database to another, blow away records, even merge two unlike databases together on a key. Sorting on up to 20 keys is done with a sort editor which uses the TSC SortMerge package. You can even build "PR" files for use with the TSC Text Processor for form letters, invoices, reports, etc. The list of features goes on and on!

You can create a database with any number of fields. Most database systems require you to limit the total data in one record to 254 characters or one sector. Not so with DATAMAN! DATAMAN allows your records to be of any length. We made DATAMAN to work for you ..... not against you!

DATAMAN was designed for easy modification and customizing with a "SHELL" program. A "SYSTEM.GEN" file allows almost any terminal or printer to be used with DATAMAN. Comes with every line of source code, program and variable descriptions, and a 160+ page ring bound manual that is second to none!

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THE ONLY DBMS AVAILABLE THAT ALLOWS ANY SIZE RECORDS AND ANY NUMBER OF FIELDS!

Datarand NEW

RANDOM ACCESS

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The same "Record Code" concept is used to make operation simple. In fact, except for the speed, it's hard to tell that you're not in DATAMAN. You can add records to DATARAND just like in the "Append" section of DATAMAN file maintenance. When you need to use DATAMAN, you can copy the desired records to DATAMAN. You can also transfer records from DATARAND which takes care of file reorganization. DATARAND comes with an instruction manual and every line of source code.

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SEPT 81

NEW

By Dick Bartholomew

BASIC PROGRAMMERS TOOLKIT

$49.95 object only
$69.95 with source on DISK!

1... DECOMPIL — Turns .BAC into .BAS files
2... XREF — Cross reference listing of BASIC programs
3... EDIT — Edit a BASIC program that's in memory while in BASIC!!!!!

NOTE: For TSC XBASIC only

NEW

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6. DISKDUMP to any port.
7. INIT memory set command
8. SAVETEXT to disk
9. READTEXT from disk
10. REDIRECT change control port
11. REPLACE prompt memory change
12. MIRROR BACKUP fast sector copy

PASSWORD PROTECTION PACKAGE

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Six programs that allow you to protect your system by preventing a bootup without the proper password.

— Warning —

PASSWORD can be overcome if the user has access to another disk without password protection that will boot FLEX.

Programs are written in 6809 assembly language

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NEW

Exclusively from FRANK HOGG

TIME/COST STUDY

by DIGITECH

We are pleased to announce a time/cost study program written with the *legal profession in mind. It will allow the attorney to keep accurate records of time and cost on a case/client basis. Reports can be generated at any time for any or all clients. Reports list the following: Client name and address, case numbers, entry dates, type of service, time, cost, check number, status (open, billed, paid), time/cost subtotal by the case, time/cost totals. Full editing for clients and/or cases.

System requirements are:
6809 computer with 56K, FLEX, XBASIC, DUAL 8" double sided/double density disk, and a smart terminal.

Price $400.00 includes 8" disk with compiled basic programs and manual. (source not available)

*The program can be modified for any time/cost type study.

Contact Frank Hogg.

NEW

Exclusively from FRANK HOGG

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From Peter Murray

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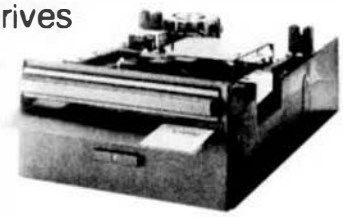

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Flex User Notes

BY: RONALD W. ANDERSON
3540 STRUBRIDGE COURT
ANN ARBOR, MI 48105

COMPUTING ON A BUDGET

A recent leter from J. Preston Brashear III started me thinking about this hobby from the standpoint of many of us who don't have unlimited funds to spend on it. (I include myself in that category). Preston indicated that he is running MiniFlex, and doesn't intend to switch to FLEX2 only to have it become obsolete too. He indicates that he may go 6809. I can certainly sympathize with such feelings, and the feeling of being left high and dry with MiniFlex when the suppliers stopped "supporting" it. Preston indicates that he would gladly buy MiniFlex versions of software if it could be bought from the original sources. After all, adding new software is vastly cheaper than starting over again with FLEX2. He asks if there are people out there who have switched, and want to sell their old MiniFlex software (original disks only). Preston has decided to organize the MiniFlex users, and if you have written software or articles on MiniFlex that have appeared in '68' or other publications, you will be receiving a letter from him that is sort of a survey. Perhaps by the time you read this, you will already have received such a letter, and his project will have gotten off the ground. I've sent Preston all the original texts of my early "Flex User's Notes", which were filled with MiniFlex software ideas, with permission to "reprint" and distribute them to anyone who wants them.

I frankly don't have many ideas regarding the problem the MiniFlex users have regarding obtaining software. I do have sympathy for their problems. I do, however, have some suggestions for those who have more time than money. (That probably includes all of us who burn the 2 AM oil in front of our terminals). Perhaps you have noticed the ad for Hemenway Associates Software Sourcebooks. I've had good experience with them. Hemenway's Relocatable Macro Assembler for the 6800 is very good. The sourcebook costs $24.95 (RA6800ML). To use the assembler, one needs LINK68, the Linking Loader at $7.95. Both use the same system dependent driver module. I believe Hemenway has a FLEX2 driver available, which he will supply if you ask about it. I don't know the price. If Hemenway is not interested, I have a FLEX2 version (of the driver) and can generate a MiniFlex version rather easily. I will supply a listing for reproduction and postage costs if Hemenway doesn't supply it. Please check with them first.

The Assembler and Loader can be typed in (if you type fast) in about 50 hours, and if you are careful to keep the line count the same as in the sourcebook, you will not have much trouble with debugging it. Someone recently asked me if there is a good cross assembler to run on a 6809 system to generate 6800 code. We decided that one could modify the Hemenway code to assemble with the 6809 TSC assembler. Of course, the assembler would still accept only 6800 mnemonics and would generate 6800 object code. I managed the conversion in a couple of evenings, having had the source on a disk, and it runs very well. Hemenway also has XA6809, a cross assembler intended to run on a 6800 to generate 6809 code. It costs $24.95 too. It is possible to assemble this source on a 6809 (after a few necessary modifications for compatibility) and have a 6809 relocatable Macro Assembler with very nice capabilities. The same system dependent driver package as runs the 6800 assembler and loader, will assemble in 6809 assembler and run with this package. When you have it working, you can go back and have great fun converting the code to take advantage of the 6809's extra capabilities such as the MUL instruction.

If you want a rather large project, purchase STRUBAL+ in sourcebook form for $49.95. This one will probably take over 100 hours to type in. The whole package, including the compiler and various sections of the runtime package adds up to well over 13,000 lines! If you have followed this column, you are aware that I have it running on my 6800 FLEX2 system. I've been critical of this compiler in the past, because it is not terribly memory efficient, but at $50 it beats not having a $250 to $300 version of Pascal because of budget problems. It does (as I have always maintained) work very well. It is not hard to use. Hemenway, just to mention all of the sourcebooks, also has a CPM like operating system called CP/68 available in source form for $34.95. All of the above sourcebooks list drivers for CP/68.

MiniFlex users, take note that Lucidata release 2.1 Pascal is available in MiniFLex version for $90. This is a version with REAL variables of 9 digit precision. It doesn't have scientific functions. You may remember that I published a set of functions for those several months ago. My functions are not the ultimate in either accuracy or speed, but they do work, and give results satisfactory for engineering programs, and hobby applications.

FORTH AGAIN

Frank Hogg's XFORTH is now being distributed. I've received a copy of the disk and the manual. The manual is something else! It is over 400 pages! This is (as I told Frank) the most comprehensive and understandable manual on FORTH that is available to my knowledge. I have "Using Forth" (advertized by Fig as the best manual available). When they see this one, they will have to change their recommendation. Believe me, Frank's, written by Chuck Eaker is far more complete and comprehensible. Chuck has a facility for explaining things in the right order. That is, he builds on what he has already told you. The first part of the manual is a tutorial on standard Fig FORTH. There is a glossary, and of course a section on XFORTH's features too. Check the ads in this issue of '68' for the price of the manual. I strongly recommend that anyone interested in any version of FORTH get his hands on this manual. Now I even understand what the word pair <BUILDS DOES> does. Try reading the Fig glossary description of <BUILDS nine or ten times and see if you understand it. Once you understand FORTH, the Fig glossary is an excellent reference, but it is too concise and uses too may terms you must understand before you can understand it, to be of much use to a beginner. The XFORTH manual takes a few pages to describe what these words do, and give an example or two of their use. I have had a chance to get XFORTH up and give it a workout. See below for some results in the way of further timing comparisons.

ON TO NEW WORLDS

Well, I've done it. I've decided to write a book teaching how to program in Pascal, using BASIC as a starting point. I have a feeling that many hobbyists have been scared off by the highly technical description of Pascal in the Jensen and Wirth Standard. We who suffer from the lack of a couple years of Computer Science courses have to have something at a less formal and technical level to illuminate us. I think I am relatively simple minded, and I have to break complex things down into terms I can understand. I'm hoping that my explainations will be clear to anyone understanding BASIC, and that they will help get many more of you into the world of Pascal. The project will take several months of my spare spare time.

PRINT ROUTINE USING A BUFFER

Several months ago, I noticed the pleas of John Tucker for a print routine that uses a buffer, so that the disk drives don't have to access so frequently. My working attempts are presented here. These versions

are for a serial printer on port 0 of a SWTP system and a parallel printer on port 7. Notice that the old inertia still has me using P.CMD and PRINT.SYS. This program presented an interesting problem. A print routine can't possibly know that you have finished printing, and therefore doesn't know enough to empty the buffer if it hasn't ended up full, which is highly unlikely. My program overwrites the FLEX WARMS jump with the address of a section of the program that empties the buffer and restores the WARMS jump in FLEX, and then uses it to exit back to FLEX.

Of course the buffer may be moved, expanded, or contracted to suit your system requirements. I assembled a large program with output to the printer using the PBUFF listed here, and the disks were accessed about every 12 or 13 pages of text! You may need to customize these with your printer drivers but conversion shouldn't be too hard, as I've tried to distinguish the added parts from the original printer drivers. Notice that the part of the print routine that doesn't fit in the allotted print driver area is at the beginning of the buffer area. The buffer starts immediately after the end of the driver.

CORDIC FUNCTIONS

Since my escapade with the Trig. function approximations, one writer has been kind enough to send me some information on CORDIC technique. This method may be used to generate the Trig. functions accurately and with relative speed. The method consists essentially of summing a series of terms, each successively smaller than the preceeding one, in such a way that the terms add up to the input angle. Meanwhile, based on whether a particular term is added to or subtracted from the sum, an X and Y value are manipulated. If one starts with X=1, Y=0 and an angle of 0, and then sums terms in such a way as to approximate the angle very closely, the X and Y terms when divided by a constant that is dependent only on the number of terms used, become the values of the Cosine and Sine of the angle respectively.

I did a program in BASIC to try these out, and with 21 terms, was able to get Sine and Cosine approximated to 6 full places. The beauty of this method is that the manipulations of the X and Y sums may be done by simple shift and add operations. If one were using a 6800, this method would be the fastest way to arrive at Sine and Cosine. However, the 6809 has its fast MUL instruction, and the functions may be calculated to the same accuracy faster using a truncated or "telescoped" series approximation. I was also able to use the technique to implement an ARCTAN function. The technique may be used for other functions than these as well.

MORE TIME TRIALS

I've had a chance to try out a few more compilers on the PRIME number test program. This time I've had to extend the job to finding primes to a limit of 10000 in order to get the times to be long enough for reasonably accurate timing. The program is not the ultimately efficient one for each compiler. I've found that a technique that speeds up execution in one compiler may slow it down in another. The fair test seems to be an algorithm that hasn't gotten unduely complex in order to save a few percent in execution time. Times in seconds are:

TSC Pascal	59
OmegaSoft Pascal	67
Lucidata Pascal	157
Dynasoft Pascal	142
tFORTH	95
XFORTH	88

The FORTH versions use a little trick (only possible in FORTH). Since the numbers involved in finding primes are all positive ingeters, it is possible to take advantage of FORTH's unsigned arithmetic functions. Since these are defined for double precision, a little manipulation is involved, but they are still much faster than the single precision signed arithmetic. I defined a "FAST MOD" and a "FAST MULTIPLY" as follows:

```
: F* U* DROP ;

: FMOD >R 0 R> U/ DROP ;
```

The multiply simply uses the unsigned multiply U* and drops the high order word of the double precision result. FMOD supplies a high order word of value zero for U/ and drops the high order word of the result. Ray Talbot is responsible for the FMOD idea which significantly speeds up the prime program presented in the Moreira Article (Feb. '68' Micro Journal). Since my algorithm uses a number of multiplies, I decided to try an unsigned multiply too, with good results.

DYNASOFT PASCAL

A number of you have probably used Dynasoft Pascal in the cassette version. Al Jost, author of Dynasoft Pascal, has recently prepared a 6809 FLEX9 version. It has much of Pascal implemented, though it is a smaller implementation than the several others available. The entire runtime interpreter is 1173 bytes! This is a P-code implementation. Not implemented are REAL variables RECORD data types, and SETS. Surprisingly, the dynamic variable features are implemented with the procedures NEW, MARK, and RELEASE. Compile time for the Prime test program, results of which are reported above, was 38 seconds. The execution time was quite respectable.

I see two very definite markets for this compiler. If you want a small implementation for "control" purposes, this would be an excellent choice. If you are a beginner and want to try out a Pascal before spending a larger amount on a full implementation, or if you don't need REAL variables implemented, this is also a good choice. Cost for the compiler without the source listing of the runtime interpreter is $60. With the runtime listing, the price is $90. The listing will be included on the diskette and will convey a license to use the interpreter in target systems (ie. processors to be sold as part of a control package for a machine etc.). Al has indicated that he presently has no plans for a 6800 version, but "I could probably be pressured into doing it if there were enough demand." This software will be available from Frank Hogg Laboratory (probably in his ad in this issue).

```
DRIVER FOR PARALLEL PRINTER          6-17-81 11:13 PM "TSC"  PAGE    1
                        *
                        *
                        * PIA DRIVER FOR PAPER TIGER PRINTER ON PORT 7
                        * THIS VERSION MODIFIED TO USE APPROXIMATELY 8K IN
                        * HIGH MEMORY AS A PRINT BUFFER TO REDUCE DISK ACCESSES IN GENERAL
                        * AND HEAD LOADS IN PARTICULAR.
                        *
                        * notes all mods for print buffer will be commented in lower case
                        * so that they will stand out.
                        *
                EOIC    PORT7   EQU     $EDIC     PIA FOR PARALLEL PRINTER
                D000    BUFEND  EQU     $D000     end of print buffer
                CC3B    NEWERD  EQU     $CC3B     Flex command pointer
                CD03    WARMS   EQU     $CD03
                        *
C000                            ORG     $C000
                        *
C000 86 3A      PINIT   LDA     #$3A
C002 B7 E01D            STA     PORT7+1
C005 86 FF              LDA     #$FF      SET DATA DIRECTION
C007 B7 E01C            STA     PORT7
C00A 86 3E      POUTA   LDA     #$3E
C00C B7 E01D            STA     PORT7+1
C00F 8E DFFF            LDX     #BUFF-1
C012 BF CC3B            STX     NEWERD
C015 39                 RTS
                        *
                        *
                        * CHECK PRINTER READY
                        *
C018                            ORG     $C018
                        *
C018 70 E01D    PCHK    TST     PORT7+1
C01B 39                 RTS
                        *
                        * OUTPUT CHARACTER ROUTINE
                        *
```

```
CCE4                        ORG     $CCE4
                    *
                    *
CCE4 7E   A000      POUT    JMP     PBUF        print routine relocated for more room
CCE7                INPTR   RMB     2           buffer input pointer
CCE9                OUTPTR  RMB     2           buffer output pointer
CCEB 00             INIT    FCB     0           buffer pointers initialized flag
CCEC 0000           SAVJMP  FDB     0           save WARMS vector here
                    *
A000                        ORG     $A000       for 8K buffer which holds about 4 pages typed text
                    *
                    * This section puts the character in ACCA into the buffer
                    * If the buffer fills, control is transfered to the next section
                    * of the program which empties the buffer to the printer.
                    * This section overwrites the WARMS jump in time with a jump to
                    * the routine that flushes the buffer. Normally it will not be
                    * filled completely the last time it is used.
                    * After flushing the buffer, the WARMS jump is restored
                    * The program saves the WARMS vector, so it will work with
                    * any version of FLEX
                    *
A000 7D   CCEB      PBUF    TST     INIT        have pointers been initialized?
A003 26   23                BNE     PBUF1       if so skip initialization
A005 34   02                PSHS    A           save the character
A007 CC   A070              LDD     #BUFBEG     both pointers to the start of buffer
A00A FD   CCE7              STD     INPTR
A00D FD   CCE9              STD     OUTPTR
A010 7D   CCEC              TST     SAVJMP      see if first time through
A013 26   0C                BNE     PBUF05      already saved warm jump
A015 FC   CD04              LDD     WARMS+1     get warmstart jump vector
A018 FD   CCEC              STD     SAVJMP      save it
A01B CC   A069              LDD     #FLUSH      set up buffer flush on exit
A01E FD   CD04              STD     WARMS+1     ensures users of PRINT exit to WARMS
A021 73   CCEB      PBUF05  COM     INIT        set flag indicating initialized buf ptrs
A024 35   02                PULS    A           get character for print
A026 34   10        PBUF1   PSHS    X           save X
A028 BE   CCE7              LDX     INPTR       get pointer
A02B A7   80                STA     ,X+         store character
A02D BF   CCE7              STX     INPTR       save pointer
A030 8C   C000              CMPX    #BUFEND     buffer full yet?
A033 27   03                BEQ     OUTBUF      if so, go output it
A035 35   10                PULS    X           else restore X
A037 39                     RTS                 done
                    *
                    * The following section will output the contents of the buffer until
                    * the OUTPTR catches up to the INPTR. It is entered on buffer full
                    * from the above section at OUTBUF, or from FLUSH at OUTB1
                    *
A038 35   10        OUTBUF  PULS    X           balance stack from fill buffer mode
A03A 34   10        OUTB1   PSHS    X           entry point for buffer flush at end
A03C BE   CCE9              LDX     OUTPTR      get pointer
A03F BC   CCE7      OUTB15  CMPX    INPTR       something to output?
A042 26   06                BNE     OUTB3       if so
A044 35   10                PULS    X           balance the stack
A046 7F   CCEB              CLR     INIT        set up next buffer full
A049 39                     RTS
A04A 17   7CB8      OUTB3   LBSR    PCHK        IS PRINTER READY?
A04D 2A   FB                BPL     OUTB3       WAIT FOR IT IF NOT
A04F 7D   E01C              TST     PORT7       CLEAR THE READY FLAG
A052 B7   E01C      POUT1   STA     PORT7
A055 86   36                LDA     #$36        TOGGLE PRINT STROBE
A057 B7   E01D              STA     PORT7+1
A05A 34   10                PSHS    X
A05C 8E   1000              LDX     #$1000
A05F 30   1F        PDL2    LEAX    -1,X
A061 26   FC                BNE     PDL2
A063 86   3C                LDA     #$3C
A065 B7   E01D              STA     PORT7+1
A068 39                     RTS
                    *
                    * This code executed on a JMP WARMS in the program that calls PRINT
                    * It flushes the buffer and then restores the WARMS vector and jumps
                    * there.
                    *
A069 BD   A03A      FLUSH   JSR     OUTB1
A06C FC   CCEC              LDD     SAVJMP
A06F FD   CD04              STD     WARMS+1
A072 7F   CCEC              CLR     SAVJMP      clear flag so FLUSH will work on next call to print
A075 7E   CD03              JMP     WARMS
                    *
                    * The remainder of 8K is the buffer
                    *
          A078      BUFBEG  EQU     *
                            END

0 ERROR(S) DETECTED
```

```
DRIVER FOR SERIAL PRINTER            6-17-81 11:18 PM "TSC"  PAGE    1

                    *
                    *
                    * ACIA DRIVER FOR HEATH PRINTER ON PORT 0
                    * PRINTER 'BUSY' TIED TO ACIA HARDWARE HANDSHAKE
                    * THIS VERSION MODIFIED TO USE APPROXIMATELY 8K IN
                    * HIGH MEMORY AS A PRINT BUFFER TO REDUCE DISK ACCESSES in GENERAL
                    * AND HEAD LOADS IN PARTICULAR.
                    *
                    * note: all code for print buffer will be commented in lower case
                    * so that they will stand out.
                    *
          E000      PORTO   EQU     $E000
          C000      BUFEND  EQU     $C000       end of print buffer
          CC2B      MEMEND  EQU     $CC2B       flex memend pointer
          CD03      WARMS   EQU     $CD03
                    *
CCC0                        ORG     $CCC0
                    *
CCC0 86   03        PINIT   LDA     #$3         RESET ACIA
CCC2 B7   E000              STA     PORTO
CCC5 86   15                LDA     #$15        SET UP CONTROL BITS
CCC7 B7   E000              STA     PORTO
CCCA 8E   9FFF              LDX     #PBUF-1
CCCD BF   CC2B              STX     MEMEND
CCD0 39                     RTS
                    *
                    * THIS IS THE END OF THE PRINTER READY CHECK
                    * (STUCK HERE FOR LACK OF ROOM BELOW)
                    *
CCD1 35   02        FINCHK  PULS    A
CCD3 39                     RTS
                    *
                    * CHECK PRINTER READY
                    * SYSTEM REQUIRES "NEGATIVE" FLAG IN STATUS REGISTER SET IF
                    * READY.  THIS SHIFTS THE COMPLEMENTED STATUS TO THE SIGN BIT.
                    *
CCD8                        ORG     $CCD8
                    *
CCD8 34   02        PCHK    PSHS    A           SAVE A
CCDA B6   E000              LDA     PORTO       STATUS
CCDD 43                     COMA
CCDE 48                     ASLA
CCDF 48                     ASLA
CCE0 48                     ASLA
CCE1 48                     ASLA                HAVE STATUS BIT IS SIGN (B7)
CCE2 20   ED                BRA     FINCHK
                    *
                    * OUTPUT CHARACTER ROUTINE
                    *
CCE4                        ORG     $CCE4
                    *
                    * POUT PSHS A SAVE ACCUMULATOR CONTENTS
                    * POUT1 LDA PORTO
                    *  BITA #$2 TEST TRANSMIT BUFFER STATUS
                    *  BEQ POUT1 NOT READY, WAIT
                    *  PULS A IF READY, GET CHARACTER TO OUTPUT
                    *  STA PORTO+1 OUTPUT IT
                    *  RTS
                    *  END
                    * this was the original print routine.  new one follows:
                    *
```

```
CCE4 7E   A000      POUT    JMP     PBUF        print routine relocated for more room
CCE7                INPTR   RMB     2           buffer input pointer
CCE9                OUTPTR  RMB     2           buffer output pointer
CCEB 00             INIT    FCB     0           buffer pointers initialized flag
CCEC 0000           SAVJMP  FDB     0           save WARMS vector here
                    *
A000                        ORG     $A000       for 8K buffer which holds about 4 pages typed text
                    *
                    * This section puts the character in ACCA into the buffer
                    * If the buffer fills, control is transfered to the next section
                    * of the program which empties the buffer to the printer.
                    * This section overwrites the WARMS jump in time with a jump to
                    * the routine that flushes the buffer. Normally it will not be
                    * filled completely the last time it is used.
                    * After flushing the buffer, the WARMS jump is restored
                    * The program saves the WARMS vector, so it will work with
                    * any version of FLEX
                    *
                    *
A000 7D   CCEB      PBUF    TST     INIT        have pointers been initialized?
A003 26   21                BNE     PBUF1       if so skip initialization
A005 34   02                PSHS    A           save the character
A007 CC   A067              LDD     #BUFBEG     both pointers to the start of buffer
A00A FD   CCE7              STD     INPTR
A00D FD   CCE9              STD     OUTPTR
A010 7D   CCEC              TST     SAVJMP      see if first time through
A013 26   0C                BNE     PBUF05      already saved warms jump
A015 FC   CD04              LDD     WARMS+1     get warmstart jump vector
A018 FD   CCEC              STD     SAVJMP      save it
A01B CC   A058              LDD     #FLUSH      set up buffer flush on exit
A01E FD   CD04              STD     WARMS+1     ensures users of PRINT exit to WARMS
A021 73   CCEB      PBUF05  COM     INIT        set flag indicating initialized buf ptrs
A024 35   02                PULS    A           get character for print
A026 34   10        PBUF1   PSHS    X           save X
A028 BE   CCE7              LDX     INPTR       get pointer
A02B A7   80                STA     ,X+         store character
A02D BF   CCE7              STX     INPTR       save pointer
A030 8C   C000              CMPX    #BUFEND     buffer full yet?
A033 27   03                BEQ     OUTBUF      if so, go output it
A035 35   10                PULS    X           else restore X
A037 39                     RTS                 done
                    *
                    * The following section will output the contents of the buffer until
                    * the OUTPTR catches up to the INPTR. It is entered on buffer full
                    * from the above section at OUTBUF, or from FLUSH at OUTB1
                    *
A038 35   10        OUTBUF  PULS    X           balance stack from fill buffer mode
A03A 34   10        OUTB1   PSHS    X           entry point for buffer flush at end
A03C BE   CCE9              LDX     OUTPTR      get pointer
A03F BC   CCE7      OUTB15  CMPX    INPTR       something to output?
A042 26   06                BNE     OUTB3       if so
A044 35   10                PULS    X           balance the stack
A046 7F   CCEB              CLR     INIT        set up next buffer full
A049 39                     RTS
A04A B6   E000      OUTB3   LDA     PORTO       get status
A04D 85   02                BITA    #2          test transmit buffer status
A04F 27   F9                BEQ     OUTB3       if not ready
A051 A6   80                LDA     ,X+         get character if ready
A053 B7   E001              STA     PORTO+1     output it
A056 20   E7                BRA     OUTB15      go get more
                    *
                    * This code executed on a JMP WARMS in the program that calls PRINT
                    * It flushes the buffer and then restores the WARMS vector and jumps
                    * there.
                    *
A058 BD   A03A      FLUSH   JSR     OUTB1
A05B FC   CCEC              LDD     SAVJMP
A05E FD   CD04              STD     WARMS+1
A061 7F   CCEC              CLR     SAVJMP      clear flag so FLUSH will work on next call to print
A064 7E   CD03              JMP     WARMS
                    *
                    * The remainder of 8K is the buffer
                    *
          A067      BUFBEG  EQU     *
                            END

0 ERROR(S) DETECTED
```

COLOR USER NOTES

***** COLOR COMPUTER EDITOR *****
by CER-COMP (C) 1981

GENERAL:

The CER-COMP COLOR COMPUTER EDITOR is a machine language program on a Cassette Tape formated for the Radio Shack COLOR COMPUTER. This report was written using the EDITOR on a CC exclusively. In general, it is a handy program to have around, but does have a few weaknesses that will be discussed later. My tape contained 3 Mach. Lang. copies of "TAPEDIT" and 1 ASCII formatted copy of "STARTUP$". One "TAPEDIT" refuses to load; no problem with the rest. A 6-page typed set of instructions were wrapped around the cassette.

DOCUMENTATION:

The Instructions are brief, but do contain enough information to get you operational with the EDITOR. If you can hang in there long enough to learn what does and doesn't work, and get comfortable with the commands, it sort of grows on you.

The first page covers the Startup Procedures (this page is the "STARTUP$" file on the tape), getting back and forth between the EDITOR and BASIC, and Tape usage. Page 2 covers the definitions used in discussing the Commands, the <BREAK> key, and Line Inputs. The last 4 pages cover the Commands.

There is no Source Listing or Memory Mapping information provided. Personally, I don't see what is to be gained by trying to keep the Program secret (we have enough trouble with TANDY there). Providing the Source Listing with GOOD Documentation only IMPROVES the product and makes it more FLEXIBLE. A Software Pro simply disassembles the code and has at it. The Neophyte is restricted to what little information is provided, and is unable to learn by studying the listing to see how procedures are accomplished. (Oops'! This is a review, not a soapbox.) The Instructions give the following memory locations: Coldstart EQU $0700; Warmstart EQU $0703; and the Line Buffer Length EQU $0754.

COMMANDS:

The following commands are used with the COLOR COMPUTER EDITOR:

LIST - like the BASIC "LIST".
NLINES - causes line numbers to be suppressed during lists or prints
TLOAD - same as CLOAD in BASIC
TSAVE - same as BASIC's 'CSAVE "NAME",A' command
TAPPEND - allows a Tape input to be added to end of current file
RESEQUENCE - renumbers word files, NOT for BASIC STATEMENTS
DELETE - allows "Cleaning House" or remove large blocks of files
SEARCH - finds all occurances of a specified 'string'
RPLACE - replaces all occurances of one 'string' with another

LEDIT - line edit, used for single line editing
AEDIT - auto edit, continues from line to line
BRESEQUENCE - for renumbering BASIC STATEMENTS (chgs GOTO, THEN,etc)
COPY - relocates a block of files and RESEQUENCES (watch out BASIC)
MOVE - like COPY but the files MOVEd are also REmoved from old loc.
SIZE - decimal amount of memory NOW IN USE, not remaining like BASIC
PRINTER - outputs to printer, use with NLINE, LIST, etc.
EXIT - one way out of EDITOR and return to BASIC
NEW - Just like the BASIC command
AUTO - brings up the next line after <ENTER> (sure is NICE)
RLINES - removes all line numbers from the Text Buffer
ILINES - puts them back again (ISA for compatability w/ other sys)

OPERATION and USES:

To "Boot" CC EDITOR, just CLOAD<ENTER> (I always prefix that with an AUDIOON; I like to monitor the LOAD); and when you get the "OK", EXEC<ENTER>. You will get COLOR EDITOR's 'READY' and a BLACK flashing cursor - makes it easy to tell you're working in EDITOR instead of in BASIC. I then loaded "STARTUPs" with 'TLOAD', and when I recieved the 'READY', tried the 'LIST' command. WOW, look at all that black on the screen (the Col. Comp. prints lowercase on the screen as inverted letters). All right, let's see what we have here. A little Editing to start with. Either 'LEDIT' or 'AEDIT' work the same while editing, "L" works on a line and then dumps you back to 'READY', while "A" lets you work a whole area in sequence. The "EDIT's" work as follows:

<BREAK> --> cancels the operation and returns you to 'READY'. It is the only way out of 'AEDIT'(short of <RESET>). Hitting the <BREAK> key is completely safe with COLOR EDITOR, it just gets you out of ANY Command and back to 'READY'. It does not, in itself, delete anything, or have any bad effect on any file. If you jump out of a command before completing it, or <ENTER>ing it, <BREAK> just leaves things where they were before.

"-->"(rt arrow) --> Moves the cursor to the right non-destructively, i.e., like the Space Bar with EXTENDED BASIC Editing. This allows positioning the cursor for changes, etc. (It is a little confusing until you get used to it, because the <SPACE BAR> actually inserts a "space" when editing with COLOR EDITOR, not position the cursor like BASIC's Editor. In a way, it actually makes sense, doesn't it?)

"<--"(lft arrow) --> Same as the "-->" except in the other direction.

"Shift -->" --> Cursor jumps to the end of the line.

"Shift <--" --> Cursor jumps back to the start of the line.

"Shift up-arrow" --> Inserts "spaces" and moves everything from that point to the right. This allows the insertion of characters into the file. (NOTE: The Line Buffer Length has no effect when you are in the 'EDIT' modes, i.e., you can punch the end of the line right past the buffer limit you may have established. This is actually a good feature as it allows simple Editing; just be aware of it and check if file length is important.)

"Shifted dn arrow" --> This control "swallows spaces" and shifts all of the file following it to the left. This is the "Delete Character" control. To replace a word in a line, you position the cursor over the first letter to be replaced, type in the new word just like there was never any words there (you are actually typing right over the old word, with each new entry replacing the old character), add extra spaces if needed with the <SHIFT> Up Arrow, and "eat up" the extra spaces with <SHIFT> Dn Arrow. It's a lot easier to do than say, as the saying goes, and you don't have to continously refer to the "Manual" to see which key to push next.

<ENTER> --> This stores your "repairs" in the Text Buffer. Take it from someone who is beginning, maybe, to learn! If you changed something, HIT THAT <ENTER> KEY ON YOUR WAY OUT. I previously stated that the <BREAK> key was non-destructive IN ITSELF, but if you make a change and <BREAK> out of the command, you just plain didn't change nothin. <ENTER>, which the Instructions call CR (and that IS what it is), loads that file in the Text Buffer - simple, huh. It really is.

"Dn Arrow" --> This allows you to move DOWN the screen to the next HIGHER line. Think about it; the screen scrolls up, putting the next line, which is higher in number, at the bottom. It's natural when you are looking at the screen. This control and the next one allows you to move from line to line while in the 'AEDIT' command. Personally, I would like to see them functional in 'LIST' also; they are handy.

"Up Arrow" --> This is the same as the Dn Arrow, yep, except in the other direction. With them, it's easy to move around while editing.

OK, it really does work as a LINE Editor, but it's called a COLOR COMPUTER EDITOR. That would mean complete, right? It IS a pretty compleat system. All your work is done with Line Numbers to provide positive control. But, you sure don't want line numbers on text, like this report. Simple, 'NLINES' makes the Computer ignore the Line Numbers; they just don't exist with this command. It is used any time Line Numbers are not wanted, such as 'PRINTER' outputs, 'TSAVE' Tape recordings, etc. It will NOT remove Line Numbers from the Text Buffer; 'RLINES' does that. 'RLINES' REMOVES the Line Numbers; they are GONE! This allows compatability with other systems (and provides a little Disk capability, too), and drastically reduces memory usage. 'NLINES' just doesn't output them, they are still in the Text Buffer. Watch out if you are working with BASIC STATEMENTS with 'RLINES' and 'ILINES' ("insert" Line Numbers). If they are removed with 'RLINES' and reinserted with 'ILINES', the GOTO's, THEN's, etc. won't come out the same if you haven't 'BRESEQUENCED' them in EDITOR or RENUMBERed them in BASIC. 'NLINES' doesn't disturb BASIC because the Numbers are still there, just not outputted. Notice the two DIFFERENT "COLOR EDITOR" commands: 'RESEQUENCE' and 'BRESEQUENCE'. The "B" prefix is for BASIC STATEMENTS; it is much slower in action because it crossreferences the GOTO's, THEN's, etc., while the plain 'RESEQUENCE' just cleans up the Line Numbers. While on the Line Number subject, let's mention that they are used just like in working with BASIC STATEMENT Numbers. You can assign any number anywhere, and that file is located in Numerical Sequence. The only difference in COLOR EDITOR is that the Line Number, itself, must contain 4 digits, with leading zeros as required. You don't need the zeros when using Line Numbers with the commands, but you do for the statements (i.e., 'LIST 0-200' works OK).

The COLOR EDITOR Tape commands are what make it worthwhile. The Tape Recorder is used somewhat like a Disk System, especially if you are working BASIC STATEMENTS with the COLOR EDITOR. There is no way to transfer files between EDITOR and BASIC except thru the Tape Deck. The 'TSAVE', 'TLOAD', and 'TAPPEND' commands are ASCII formatted EDITOR Tape operations which are compatible with BASIC's CSAVE "NAME",A format. CLOAD doesn't care how the tape was saved, it will LOAD just as well one way or the other (except Mach. Lang. - binary - where an "M" must be tacked on to the command. Therefore, if you CSAVE in ASCII with BASIC, EDITOR's 'TLOAD' will load it, and EDITOR's 'TSAVE' will be CLOAD'ed by BASIC. What does all of this get you? Well, suppose you are working on a large BASIC program. After living with this EDITOR a while, I'd rather develop the BASIC program on the COLOR EDITOR; the 'AUTO' sure is nice, and the Line Editing is simple and convienent. But, the program sure won't "RUN" in COLOR EDITOR. Also, I normally break a large program into smaller sections, check them out, and then put them together. With the COLOR EDITOR's 'TAPPEND', I can load a taped file into the Text Buffer that is "appended" to the end of the current Text in the Buffer. Bingo! instant merge, no worrying about which PEEK to POKE, etc. Also, the EDITOR's 'SEARCH', 'RPLACE', 'MOVE', 'COPY', and 'BRESEQUENCE' commands make it easier to write a program in the COLOR EDITOR (how many times have you tried to copy a long BASIC "DRAW" or "MUSIC" statement into another location?).

As mentioned at the start, this whole Report was accomplished with the COLOR EDITOR. It works as a basic Word Processor, even if it was not written to be one. The Line Buffer was set at 69 characters with a BASIC 'POKE &H754, 74<ENTER>' Statement before entering the COLOR EDITOR (I wanted a 7" column width, so a 10 CPI printer yields 70 characters in 7" - 5 for the EDITOR's file control - 1 for a "fudge factor" = a 74 char. Line Buffer length). When the buffer recieves it's 69 chars., the cursor stops and no input keys make it to the screen. Then you end the line, <ENTER> it, and the next Line Number pops up on the screen (in 'AUTO' Command). Nice!

WEAKNESSES:

The one relatively major weakness I have found with this Program is the lack of PRINTER CONTROL provided. Agreed, the COLOR COMPUTER is not one of the stronger machines when it comes to working with a printer, (in fact, it's LOUSY), but a program with this capability should provide that control. Some way is needed to get ASCII Control Characters to the Printer without them being printed. COLOR BASIC provides a method, albeit cumbersome, with the PRINT#-2,CHR$(this) and PRINT#-2,CHR$(that), etc. There's not even a ESC key on this Computer. It's strong on a TV Screen, but if you are using a decent Printer, be prepared for a lot of PRINT#-2,CHR$(sel) Statements. A Word Processor, even a minor one like this Program, MUST provide the control thru Software. Other weaknesses are minor; a bell tone about 5 characters before the end of the Line Buffer is needed, the "up arrow, dn arrow" scrolling in 'LIST' would be helpful (especially with the small "window" of a 32 x 16 TV Screen), and the files are loaded onto the Tape with the program mighty close together. The only way I could separate them was with an AUDIOON:MOTORON<ENTER>, and while it is running, type in MOTOR OFF and wait with my finger on the <ENTER> key to stop the tape at the end of the program. The one "TAPEDIT" program I couldn't LOAD was the first one on the tape. I couldn't SKIPF it because it always shuts down with an I/O ERROR, and trying to restart without the Header is a sure shutdown.

Finally, the Documentation is close to non-existant, and the Instructions could be more complete. They do get you operational, but you have a lot to learn the hard way. I feel that a program for the COLOR COMPUTER should have a fairly complete set of instructions, because the normal user is not going to be an "experienced" Computer operator. I'll give Tandy one thing, the two BASIC MANUALS (the new ones), will get a new Computer user "booted up".

STRENGTHS:

Don't let the weaknesses scare you off from a GOOD program. Anyone with just a little Keyboard Time can get confortable with the COLOR EDITOR in a short time. The problems mentioned can be worked around, and it's operational simplicity make it extremely functional and powerful. It is not meant to be a Word Processor; a good EDITOR it IS. I would recommend it to anyone who is using the COLOR COMPUTER for anything except just plugging in a Cartridge and playing games.

The "COLOR COMPUTER EDITOR" is avalible from:
CER-COMP
5566 RICOCHET AVE.
LAS VEGAS, NEVADA 89110

I would give this Program an AA+ on Don's rating scale (there's one in every crowd, Don).

Robert L. Nay
3715 Rainbow Drive, A909
Gadsden, Al. 35901

DEAR SIRS;

I WOULD LIKE TO SUBMIT THE FOLLOWING ARTICLE FOR PUBLICATION YOUR MAGAZINE. I EXPECT SOME OF THE READERS USING THE TRS-80 COLOR COMPUTER WILL NEED THE FOLLOWING INFORMATION.

SINCERELY,

Gary McConville

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FOR THOSE OF YOU WHO MAY HAVE IDEAS OF INTERFACING THE EPSON MX-80 PRINTER WITH THE TRS-80 COLOR COMPUTER, THIS ARTICLE IS FOR YOU.

BEFORE YOU GET HYPED UP ON THE LOW PRICE OF THE PRINTER REMEMBER THAT THE COLOR COMPUTER SENDS SERIAL DATA ONLY. THIS MEANS YOU MUST EITHER FIND SOME MEANS OF CONVERTING THE SERIAL TO PARALLEL OR PURCHASE THE 8141 SERIAL INTERFACE OPTION (AROUND $70). THE 8140 OPTION HAS A 2K BUFFER FOR ABOUT TWICE THE PRICE... THAT IS IF YOU CAN FIND ONE. EACH WORD IS MADE UP OF A STARTING PULSE, SEVEN DATA PULSES, AND TWO STOP PULSES. THE COMPUTER HAS TO STOP AFTER SENDING EACH LETTER AND WAIT FOR THE "DATA READY" PULSE RETURNED FROM THE PRINTER. SINCE YOU ARE SENDING PULSES TO THE PRINTER AT A RATE OF 600 BAUD (PER SECOND) AND EACH LETTER REQUIRES TEN PULSES (PLUS THE ACKNOWLEDGEMENT) THE BEST SPEED YOU COULD POSSIBLY HOPE FOR WOULD BE UNDER 60 CPS. THEN THERE'S THE TIME IT TAKES TO FILL THE BUFFER (80 CHARACTERS) FOR EACH LINE WHICH ALLOWS THE BI-DIRECTIONAL FEATURE TO TAKE PLACE.

PARALLEL CONVERSION WON'T SPEED THINGS UP EITHER. SINCE THE COMPUTER SENDS ONLY AT 600 BAUD THE PARALLEL CONVERTER WILL HAVE TO WAIT ON THE COMPLETE TEN-PULSE SIGNAL TO PASS IT ON IN A PARALLEL FORM. PRICE WOULD BE THE DETERMINING FACTOR. IN THIS CASE IT'S IN FAVOR OF THE SERIAL INTERFACE.

THE 8141 BOARD PLUGS RIGHT INTO THE MOTHER BOARD. AFTER STEPPING THROUGH THE MX-80 MANUAL YOU WILL REMOVE THE COVER AND FIND TWO DIP-SWITCHES ON THE MOTHER BOARD. IT IS WISE TO REMOVE THE DUST COVERS AND CHECK THESE CAREFULLY. THEY MAY NOT BE SET AS THE CORRECT DRAWING SHOWS ON PAGE 14 OF THE USER'S MANUAL. MINE WEREN'T. BEWARE THAT THESE SWITCHES ARE UPSIDE DOWN AND THE HIGHEST NUMBERED UNIT

CHES START ON THE TOP.IF YOU WANT FOR ION CHARACTERS SUCH AS JAPANESE YOU SHOULD REFER TO APPENDIX C. OTHERWISE THEY SHOULD BE IN THE 'FACTORY SET' POSITIONS.A FTER REPLACING THE DUST COVERS ON THE SWITCHES YOU ARE READY TO INSTALL THE NOTA RIOUS 'SERIAL INTERFACE BOARD'.TAKE TIME TO BE SURE THE CONNECTING PLUG MATES CO RRECTLY WITH THE JACK ON THE BOARD BELOW.NOW USE THE FOUR SCREWS INCLUDED TO HOL D DOWN THE INTERFACE BOARD ONTO THE FOUR SUPPORT POSTS.APPLY THE CABE GROUND WIR E FROM THE MOTHER BOARD AND INSERT IT ONTO THE 1PI (OR GROUND) ON THE INTERFACE BOARD AND IT LOOKD LIKE YOU'RE ALL OET TO GO.

NOT YET. YOU STILL HAVE TO SET THE DIP SWITCHES ON THE INTERFACE BOARD.OFF COMES THE DUST COVER AND THE SWITCHES SET SET AT 600 BAUD, 7-BIT WORD LENGTH, A ND PARITY OFF.DON'T WORRY ABOUT THE ROUTINE WITH THE JUMPERS. THEY ARE ALL CORR ECT IF THEY ARE AS THE FACTORY SET CON ITION IN TABLE I (PAGE 3 OF THE INTERFACE MANUAL).NOW ALL YOU HAVE TO DO IS TO REMOVE THE COVER PLATE FROM THE COVER (IT' S HELD ON ONLY WITH TAPE). INSTALL THE DUST COVER ON THE DIP SWITCH AND REASSEMB LE THE CASE IN THE REVERSE ORDER.

WITH EVERYTHING ALL SET IT'S ALL READY TO GO. RIGHT? GUESS AGAIN!THE PIN SETTINGS RADIO SHACK LISTS IN THE SERIAL INTERFACE TABLE ON PAGE 26 OF THE BLACK OPERATING MANUAL IS 'NOT' CORRECT.AFTER HAGGLING WITH THE LOCAL SERVICE REPS FO R EPSON HERE IN ATLANTA FOR A WHILE AND GETTING NOWHERE FAST I TRIED THE FORT WO RTH HOT-LINE.ARMED WITH WARNINGS OF BEING ON HOLD FOR HOURS I FIXED A COLD DRINK AND SAT BACK WITH THE BOOB TUBE BLARING AWAY BEFORE I CALLED.THE TEN MINUTE WAI T WASN'T SO BAD IF YOU FORGET THE REPETIOUS RECORDING THEY HAVE AND REMEMBER THA T IT'S AN 800 NUMBER YOU HAVE DIALED.SOME SERIOUS HEAD SCRATCHING TOOK PLACE BEF ORE THE DEMON WAS UNCOVERED.IT SEEMS THAT THE TABLE IN THE OPERATING MANUAL IS F OR MODEMS.THE CARRIER DETECT LINE IS NOT EVEN USED. IF YOU HAVE THE RADIO SHACK PRINTER CABLE FOR THE 25-PIN CONNECTOR YOU SHOULD IMMEDIATELY SNIP THAT NASTY B LACK WIRE AT THE 25-PIN CONNECTOR END.THE 25-PIN CONNECTOR SUPPLIED BY THE SHACK ONLY HAD 4 PINS INSERTED INTO HOLES IN THE PLUG.IT SEEMED LIKE A POOR WAY TO MI NE SUCH A LARGE CONNECTOR UP SO I BOUGHT A 4-PIN TO 4-PIN DIN PLUG SET AT RADIO SHACK ALONG WITH ANOTHER 25-PIN CONNECTOR AND USED THE ORIGINAL AS A SPARE.FOR T HOSE OF YOU WHO WANT TO USE THE RADIO SHACK CABLE KEEP IN MIND THAT TO CHANGE PI N SETTINGS ON THE 25-PIN PLUG YOU WILL HAVE TO PUSH THE PINS OUT OF THE ORIGINAL SPOTS AND REINSERT THEM INTO THE CORRECT ONES.CORRECT PIN SETTINGS ARE LISTED I N THE TABLE BELOW.

WELL, I HOPE I HAVEN'T DISCOURAGED ANYONE AWAY FROM USING THE EX-80 PRINTER .ONCE YOU GET USED TO THE PRINTING SOUND IT MAKES YOU WON'T DO WITHOUT IT.THIS L ITTLE BABY PUTS ON SUCH A SHOW IT'LL MAKE YOU FORGET ALL ABOUT THE NICE COLOR GR APHICS OF THE COMPUTER!THE ONLY TWO PROBLEMS I'M HAVING WITH IT NOW IS TURNING I T OFF AND KEEPING IT WELL FED WITH PAPER!

COMPUTER		PRINTER
2	=	20
3	=	7
4	=	3

DUMP

by Jeff Brown

A Memory dump is one of the most useful computer utilities. Unfortunately, Good memory dumps are scarce for many micro systems. On my SWTPc 6800 system the only way I could get a memory dump was by doing a cassette dump (SWTBUG command "P"), and trying to separate the memory contents from the header and checksum. This is very tedious when you are faced with a continuous stream of letters and numbers. In addition to that inconvenience, no ASCII was printed to help interpret the numbers, and the output could not be printed on a line printer.

This program is virtually monitor independent (except for the input routines). All the output routines are contained in the program so a line printer, or any other device, may be used. The only modification required to run on another 6800 system is to adapt the printer initialization and driver routines for your printer. If you won't be using a printer, the init and driver can be replaced by NOP's. DUMP occupies the high end of memory, and uses no "page 0" storage so the program should not interfere with anything else. It can be relocated by changing all the $6XXX references to 1,2,3,4,5, or 7 to locate it in high memory.

Using The Program

When run, DUMP will identify itself, and proceed to ask for a line interval. This is actually the line length of the output. This would normally be $10, by convention, but any value will work. This is very useful if you want to examine a fixed format table in memory, or use the whole width of a wide sheet of computer paper. In any event, the input routine requires a 2 hexadecimal value to be entered. Then the starting address is requested, followed by the ending address. These must be 4 digit hexadecimal values. Then DUMP asks for the output device. The response should be either a "C" for the console, or a (CR) (carriage return) for the printer. The printer is effectively the "default". This can be changed if desired. DUMP will then output the contents of the specified memory block.

This is the most useful memory dump I have seen for the 6800. Having a variable line length has been a valuable feature for me - I hope that you will find it as useful.

Submitted by NW 680X SIG
POB 5282
Kent, WA 98031

```
                        NAM   HEX.MEMORY.DUMP
                    * JEFF BROWN    2/17/80
                    *
                    * THIS PROGRAM OUTPUTS A DUMP OF SPECIFIED MEMORY
                    * TO EITHER THE CONSOLE OR THE PRINTER.  THE USER
                    * MAY SPECIFY THE LINE LENGTH (INTERVAL). THIS IS
                    * VERY HANDY FOR DUMPING FIXED LENGTH TABLES, OR
                    * USING THE WHOLE WIDTH OF WIDE PAPER.

                    * MON LINKS
(E047)              BADDR EQU   $E047     INPUT 4 HEX DIGITS
(E055)              BYTE  EQ    $E055     INPUT 2 HEX DIGITS
(E1AC)              INCEE EQU   $E1AC
(E0E3)              MON   EQU   $E0E3

                    * ASCII SYMBOLS
(000D)              CR    EQU   $0D
(000A)              LF    EQU   $0A
(0020)              SPC   EQU   $20

(6500)                    ORG   $6500

                    * PRINTER  INITIALIZATION FOR DATAPRODUCTS M-200,
                    * THIS WILL NOT WORK FOR ANY OTHER PRINTER.
6500 86 20                LDA A $0020     INIT PRINTER
6502 B7 801F              STA A $ 01F
6505 86 FF                LDA A #$FF
6507 B7 801E              STA A $801E
650A 86 2C                LDA A #$2C
650C B7 801F              STA A $  1F

650F 7F 6682              CLR   OUTDEV    OUTPUT TO CONSOLE
6512 BD 660D              JSR   PCRLF
6515 CE 6637              LDX   #INTRO    PRINT HEADER
6518 BD 6601              JSR   PSTR
651B BD 660D              JSR   PCRLF
651E CE 6647              LDX   #INT      ASK INTERVAL
6521 BD 6601              JSR   PSTR
6524 BD E055              JSR   BYTE
6527 B7 6681              STA A INTVAL
652A BD 660D              JSR   PCRLF
652D CE 6657              LDX   #BEGMSG   ASK BEGINNING ADDR
6530 BD 6601              JSR   PSTR
6533 BD E047              JSR   BADDR
6536 FF 667D              STX   CURPTR
6539 CE 666A              LDX   #END MSG  ASK ENDING ADDR
653C BD 6601              JSR   PSTR
653F BD E047              JSR   BADDR
6542 FF 667F              STX   ENDADD
6545 BD 660D              JSR   PCRLF
6548 CE 6615              LDX   #DEVMSG   GET OUTPUT DEVICE
654B BD 6601              JSR   PSTR
654E BD E1AC              JSR   INCEE
6551 B7 6682              STA A OUTDEV    A WILL BE > 0
```

```
65B4 81 43          CMP A #'C
65B6 26 03          BNE   GO
65B8 7F 6682        CLR   OUTDEV
65BB BD 660B  GO    JSR   PCRLF
65BE 7F 6683        CLR   STOPF

65C1 CE 6679  OLNE  LDX   #CURPTR
65C4 BD 65E6        JSR   OUT4HB
65C7 BD 65C9        JSR   SPACE
65CA FE 6679        LDX   CURPTR
65CD F6 6681        LDA B INTVAL

65D0 BD 65E9  DOVAL JSR   OUT2HB    OUTPUT BYTE VALUE
65D3 BD 65C9        JSR   SPACE
65D6 BC 667F        CPX   ENDADD    WAS IT THE LAST BYTE?
65D9 27 2F          BEQ   ENDPAD   YES
65DB 08             INX             NO, GO AHEAD FOR NEXT
65DC 5A             DEC B           DONE WITH LINE?
65DD 26 F2          BNE   DOVAL     NO

65DF BD 65C9  ASCII JSR   SPACE
65E2 BD 65C9        JSR   SPACE
65E5 FE 6679        LDX   CURPTR
65E8 F6 6681        LDA B INTVAL
65EB A6 00    OUT   LDA A 0,X
65ED 81 1F          CMP A #$1F      BELOW THE LOWEST PRINTABLE CHARACTER
65EF 23 33          BLS   NOPRNT
65F1 81 7E          CMP A #$7E      LAST PRINTABLE CHARACTER
65F3 22 2F          BHI   NOPRNT
65F5 BD 33    OUT1  JSR   OUTEEE
65F8 08             INX
65F9 5A       OUT2  DEC B
65FA 26 F0          BNE   OUT
65FC FF 6679        STX   CURPTR    STORE NEW START
65FF BD 660D        JSR   PCRLF
6602 7D 6683        TST   STOPF     END?
6605 27 BE          BEQ   OLNE
6607 BD 660D        JSR   PCRLF
660A 7E E0E3        JMP   MON

                    * END OF BYTE PRINTING - NOW TAB OVER TO FINISH
                    * THE ASCII FOR THE LAST LINE.
660D 7C 6683  ENDPAD INC  STOPF
6610 5A             DEC B
6611 27 CF          BEQ   AS II     (NO TAB)
6613 B6 6681        LDA A INTVAL
6616 10             SBA
6617 B7 6681        STA A INTVAL
661A BD 0B    OUSPC JSR   SPACE
661C BD 0B          JSR   SPACE
661E BD 09          JSR   SPACE
6621 5A             DEC B
6622 26 F7          BNE   OUSPC
6624 20 BD          BRA   AS II

6626 86 2E    NOPRNT LDA A #'.
```

```
MEX.MEMORY.DUMP                 FERCOM 6800 ASSEMBLER V2.B  PAGE  0003

65C3 20 CB          BRA   OUT1

                    ***************
                    * SUBROUTINES *
                    ***************

65C5 86 20    SPACE LDA A #$PC
65C7 37       OUTEEE PSH B
65C8 7D 6682        TST   OUTDEV
65CB 27 0D          BEQ   OUTEE2
                    * TO PRINTER
                    * THIS PRINTER DRIVER IS FOR A DATAPRODUCTS M-200.
                    * THIS WILL NOT WORK FOR ANY OTHER PRINTER.
65CD F6 801F  OUTEE1 LDA B $801F
65D0 2A F9          BPL   OUTEE1
65D2 F6 801E        LDA B $801E
65D5 B7 801E        STA A $801E
65D8 20 0A          BRA   OBTEE3
                    * TO CONSOLE
65DA F6 D004  OUTEE2 LDA B $D004
65DD 57             ASR B
65DE 57             ASR B
65DF 24 F9          BCC   OUTEE2
65E1 B7 B003        STA A $B003
65E4 33       OUTEE3 PUL B
65E5 39             RTS

65E6 BD 01    OUT4HB BSR  OUT2HB
65E8 08             INX
65E9 A6 00    OUT2HB LDA A 0,X
65EB BD 04          BSR   OUTHL
65ED A6 00          LDA A 0,X
65EF 20 04          BRA   OUTHR

65F1 44       OUTHL LSR A           OUT HEX LEFT BCD DIGIT
65F2 44             LSR A
65F3 44             LSR A
65F4 44             LSR A
65F5 84 0F    OUTHR AND A #$0F      OUT HEX RIGHT BCD DIGIT
65F7 8B 30          ADD A #$30      ASCII FIX
65F9 81 39          CMP A #$39
65FB 23 CA          BLS   OUTEEE
65FD 8B 07          ADD A #$7
65FF 20 C6          BRA   OUTEEE

6601 A6 00    PSTR  LDA A 0,X
6603 81 04          CMP A #$04
6605 27 05          BEQ   PSTR1
6607 08             INX
6608 BD 65          BSR   OUTEEE
660A 20 F5          BRA   PSTR
660C 39       PSTR1 RTS

660D 86 0D    PCRLF LDA A #$0D
660F BD E4          BSR   OUTEEE
6611 86 0A          LDA A #$0A
6613 20 F2          BRA   OUTEEE

6615 6F       GOOMSG FCC  /Output Device (C or (CR) for P)? /
6616 75 74
6618 70 75
661A 74 20
661C 44 65
661E 76 69
```

```
6620 63 65
6622 20 28
6624 43 20
6626 6F 72
6628 20 3C
662A 43 52
662C 3E 20
662E 66 6F
6630 72 20
6632 50 29
6634 3A 20
6636 04             FCB   04
6637 48       INTRO FCC   /Hex Memory Dump/
6638 65 78
663A 20 4D
663C 65 6D
663E 6F 72
6640 79 20
6642 44 75
6644 6D 70
6646 04             FCB   04
6647 4C       INT   FCC   /Line Interval: /
6648 69 6E
664A 65 20
664C 49 6E
664E 74 65
6650 72 76
6652 61 6C
6654 3A 20
6656 04             FCB   04
6657 53       BEGMSG FCC  /Starting address: /
6658 74 61
665A 72 74
665C 69 6E
665E 67 20
6660 61 64
6662 64 72
6664 65 73
6666 73 3A
6668 20
6669 04             FCB   04
666A 20       ENDMSG FCC  / Ending address: /
666B 20 45
666D 6E 64
666F 69 6E
6671 67 20
6673 61 64
6675 64 72
```

```
MEX.MEMORY.DUMP                 FERCOM 6800 ASSEMBLER V2.B  PAGE  0005

6677 65 73
6679 73 3A
667B 20
667C 04             FCB   04

                    * TEMPORARY STORAGE
667D                CURPTR RMB  2       CURRENT LINE TO BE WORKED ON
667F                ENDADD RMB  2       ENDING ADDRESS
6681                INTVAL RMB  1       LINE LENGTH
6682                OUTDEV RMB  1       OUTPUT DEVICE
6683                STOPF  RMB  1       STOP FLAG

                    END
00  Error(s) Detected
```

LINKING LOADER /09

A Linking Loader For TSC's Absolute 6809 Assembler
by H.L. Harkness

One of major drawbacks of the FLEX 9 operating system is the lack of a relocating linking loader/assembler, at least up until recently. At this writing, TSC is working on one, and there are a few from other vendors, but there is another drawback: The price of such a package is about $200. Actually, for a good one, this is not a bad price. I personally came very close to buying one, but it was a little difficult at the time to scrape up the money. Therefore, I worked out a method that would give me at least the absolute minimum features of a relocating loader -- at the price of writing only position-independent code, and using some extra macros.

Why a linking loader?

If you have never attempted to write a major assembly language project, you might not understand the reason for all the fuss and bother. However, I think anyone who has tried to write a 300 line absolute assembly program will appreciate RLOAD.

The thing you get from a linking loader is the ability to write modular code in an easy-to-use format. Modularity can be

achieved by use of the LIB feature of TSC's assembler, but in order to use that, you must re-assemble all of the code in the entire program to change any part of it. Also, if your collection of general-purpose subroutines begins to grow large, you begin having problems with keeping symbols unique.

A linking loader, on the other hand, allows you to make a change in a program by assembling a single subroutine, and having the loader install it into the program. It is similar to appending several subroutines together, except that you don't need to worry about where each routine is going to be loaded, and you can 'append' several routines at once. The loader takes care of all the bookkeeping, and even furnishes a map of where all the routines are.

With a linking loader, it becomes easier to build a library of tools such as the ones described in Software Tools, by Kernighan and Plauger, which can be linked together in order to form large, powerful programs very quickly. You can also more easily write test routines which can exercise a single subroutine before linking it into a larger program.

I didn't really start off to write a linking loader. What I really wanted was a really good interactive editor. After several careful readings of Software Tools, I decided that I could write the editor that they described entirely in 6809 assembly without a great deal of trouble.

Things got off to a good start, in spite of the fact that all I had to work with was an absolute assembler. However, it soon became clear that some sort of segmentation of subroutines would be absolutely necessary. I worked out a scheme whereby I could more or less relocate a module using a 'counter' scheme, but I still had to re-assemble all of the subroutines in a program to run it. I worked out another scheme with which I got a little farther, but it was obvious something entirely different was required when I ran out of symbol table space...

Then I had a disk failure, which wiped out nearly all of the work I had done on the editor. (I am currently in the habit of keeping no fewer than two backups...)

As I was sinking slowly into the deep gloom of hopeless depression, inspiration struck. It appeared possible to fool the assembler into generating records which could be used to relocate and link subroutines. By using ORG statements addressing memory that doesn't exist on my system, I could generate different types of records which could be used by a special loader.

I quickly composed the macros for ENT and EXT, at which time I saw that the design could be simplified by the macro MODULE. My friend, Paul Schumann, agreed to 'walk through' the code with me. He suggested that I include some other features in the MODULE macro. He also suggested that RLOAD should build a core-image file, instead of using a load-and-go arrangement. This would allow the linking of programs larger than the memory capacity required to run RLOAD.

Although Paul is an accomplished software guru, he was not familiar with the 6809. Then. When he found out the beast has TWO stack pointers, he rushed out and got his own manuals on it. I think he is now 'hooked'.

I had originally hoped that I could use the loader to bootstrap itself directly, but as the design evolved, I found that I would have to go back and modify the source for each module instead of just changing the macros and re-assembling. Fortunately, the required changes were minor.

I never did completely finish this program, at least at the time I sent this article in. Once I got the bare essentials running (I got the loader to load itself), I immediately set off using it to write other utility programs. The planned additions of a sorted symbol table, counters, and user directed mapping, although simple enough to do, just didn't seem as important once I overcame the single worst aspect of the TSC assembler.

The following is an overview of the project:

Inputs:
1) File containing all filenames to be linked.
2) One or more binary files containing link information.

Outputs:
1) Load map
2) Symbol table
3) Core image file

RLOAD uses a two-pass algorithm. Pass one builds the symbol table in core and writes the load map to the printer. It spots multiple definitions of entry points.

Interpass outputs the symbol table to the printer. Someday, I intend to install a sort routine, (which may happen before this version is published) as well as some other features designed to make the program easy to use. (I am open to suggestions) Undefined externals are assigned a value of $FFFF, but the current version of the loader does not give you any other warning.

Pass two builds and writes the core image file to the disk.

Hierarchy:

```
RLOAD   Relocating linking loader
OSLINK  FLEX entry points
   PASS1 Build symbol table and load map
     GETNAM Get next binary file
     RDBNRC Read a binary record
     EXTPRO Process external record
       ZCOPY Copy string
       SEARCH Search symbol table for entry
         SCOMPR Compare strings
       ENTER Make symbol table entry
     ENTPRO Process entry point record
       ZCOPY
       SEARCH
         SCOMPR
       ENTER
     ABSPRO Process absolute entry point record
       ZCOPY
       SEARCH
         SCOMPR
       ENTER

   NTERPS Interpass process
     SORT (dummy)

   PASS2 Build core image file
     GETNAM
     RDBNRC
     EXT2 Link to external
       SEARCH
```

```
      SCOMPR
    WRBNRC Write binary record
```

To use RLOAD:

Use insert file (using LIB feature of the assembler) MODULE.MAC at the beginning of each source module. Use macro MODULE before any code. EXT and ENT macros may be used anywhere in the module between MODULE and END, subject to limitations imposed by the fact that the EXT macros generates a 16-bit data word which must be branched around. I recommend that ENT and EXT be at the beginning of the module. ENT and EXT must have one parameter per invocation.

The EXT macro generates an indirect address link for the external. To call an external subroutine, you must jump indirect through that link address, i.e.:

```
    ...
    EXT <external>
    ...
    JSR [<external>,PCR]
```

I use the angle brackets to indicate that the enclosed word must be replaced with an actual name.

The module will not actually be relocated in the usual sense of the word, but simply moved to another spot in core. Therefore, you must use position-independent code throughout. (Exception: Be sure that calls to fixed routines such as FLEX calls are NOT position-independent, since FLEX will stay put) I chose to use ABS entry points in a module named OSLINK for linkage to FLEX. That way, if I decide to write a different version of a FLEX routine, I can change only OSLINK and re-load the program to install the new subroutine, instead of changing the insert file and re-assembling all of the many subroutines in my system. A close examination of the loader itself will show some of the techniques involved.

To invoke RLOAD, enter

```
+++RLOAD,<linkfilename>
```

where <linkfilename> is the file containing the names of modules to be linked. The default extension for <linkfilename> is .TXT, and the defaults for the files to be linked is .BIN. The plus signs are the FLEX prompt.

Theory of operation:

TSC's manual on FLEX includes an advanced programmer's guide which has all the necessary information on the file structures and the use of the file manager system (in short, all of the information needed to write a program like RLOAD).

Basically, a logical (not actual) binary record looks like this:

Byte	Contents
0	Start of record indicator ($02)
1-2	Load address
3	Byte count (of data)
4-n	Data

The transfer address record is a three-byte record beginning with $16, and containing the entry point address.

The physical record may have more than one logical record, and a logical record may span physical records.

For more detailed information, you should consult the section on the file management system (FMS).

RLOAD reads the logical binary records, and identifies the records with addresses $FFF0-$FFF3 as special. The listing of the main routine includes the expansion of the insert files (using the LIB feature). These special markers are generated by the macros ABS, ENT, EXT, and MODULE. ABS is used to indicate an absolute entry point, i.e. a pointer to an operating system routine. ENT is used to indicate a relocatable entry point. EXT is used to allocate a link word for the module to used for access to the ABS and ENT entry points in other modules. The MODULE macro is for the purpose of measuring the length of the module (along with ENDMOD), and for inserting an arbitrary string into the load map. I realize that there are other ways of accomplishing the length measurement, but I chose the easy way.

A word of caution: If you make a mistake and write any code which is not position-independent, the resulting problem can be very difficult to find. Generally, the symptoms are: You have just assembled a subroutine, and load it into memory by itself to test it using a debugger. It works just fine, so you link it into a program which will use it, and the program immediately wanders off into the weeds. Explanation? The first position-dependent instruction encountered just sent the processor somewhere into low core.

There are many things which could be added to RLOAD. In addition to adding the SORT routine, and implementing counters, as I had originally planned, it would be almost trivial to add a COMMON feature. One thing I did add just before this release was the ABS statement, which works like an ENT statement, but does not cause the entry to be relocated. In the module OSLINK, I used this feature to load the symbol table with the FLEX addresses used in the loader.

You may have noticed that there is a small problem in just assembling the source as presented in the listings. You will end up with all of the linkable binaries, and no way to link them. The way I got around this bootstrap problem was to prepare a special set of macros for the EXT links, and set the origin of each module, and inserted these values in the EXT statements of each module.

Example: In the insert file MODULE.MAC, use

```
EXT     MACRO
        ORG       EXTORG
        FCC       '&1',EOS
        CTR 0
&1      FDB       &2  Compare to listing
        ENDCTR 0
        ENDM
```

And in a program which uses (arbitrary example) WRBNRC:

```
     EXT WRBNRC,$0E50  (From load map)
```

In WRBNRC, you will need to add:

```
CTR0 SET $0E4C
```

To be continued...

ET/ETA-3400 TO SS50

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This article deecribes how to interface a Heathkit Microproceeaor Trainer ET-3400 and a Heathkit Memory and Input/Output Accessory ETA-3400 (TM Heath Co.) to a SS-50 buss. It provides the ET/ETA-3400 owner with suggestions on hardware and software requirements necessary to expand the units into a more usefull and flexable system.

Information about the author

Presently Manager of his own Insurance/Indent Sales business, 36 years old, graduate of the "College of Hard Knocks" (Ex-US Coast Guard Electronics Technician) the author entered the Electronics Field at the tender age of 13 when he wanted to know why the crystal radio he'd borrowed from his cousin didn't need batteries.

While in High School, he took a two year correapondence course in Basic Electricity, Elementary Electronics and TV and Radio Repair from De Vry Technical School. After High School, he entered the US Coast Guard, attended Electronics Technicians School at Grotton, Connecticut, and served for an additional three years before being discharged as Electronic Technician Second Class. He also worked for a time with ITT out of their Paramus, New Jersey Office as a Field Engineer, installing electronic equipment under contract with the US Navy. Most recently,however, he has been out of the electronics business except in the computer hobby area.

Almost everyone who has the ET/ETA-3400 MUST have, at one time or another thought about expanding it into a bigger more ueefull system. The following article will describe how I interfaced my units to a SS-50 Buss.

The entire project, because of the money and time that's involved, took over a year, and consisted of the following parts:

1. Readdressing the Trainer's RAM ICs 14-17
2. Modifications to the ET/ETA-3400
3. Construction of a wirewrapp interface card
4. Software rewriting

The below items are needed to complete the project:

1. Heathkit ET-3400 Microprocessor Trainer
2. Heathkit ETA-3400 Memory I/O add-on
3. SS-50 Motherboard and Power Supply
4. Memory card(s), ect.
5. LOTS of time, patience and some money!

READDRESSING THE TRAINER RAM ICs 14-17

This part of the mod is not really required, but it's an easy way to start, and you gain .5K of RAM to be used for scratchpad and stack. My thanks to James Greger for his help with this and the RE line modification.

Those of you who have both the trainer and the add-on know that when you purchase the add-on, Heath tells you to pull ICs 14-17, and not to reinsert them when you are using the ETA-3400 as this would mean that the trainer is addressing two RAMs in the 0000-01FF(Hex) area. To change the RAM addressing, cut the trace that connects IC3 pin 13 and IC2 pin 1, then run a jumper from IC3 pin 13 to one of the IC2 pins as shown in Fig. 1. I used A000-A1FF(Hex) as this is the address that Southwest uses. You should note that if you ever would like to run the trainer by itself, you'll have to remove this mod or install a SPDT switch so you can readdress these RAMs back to 0000-01FF(Hex).

BY THE WAY, if you don't know how to tell pin 1 of an IC from a capacitor, you SHOULD NOT TRY THESE MODIFICATIONS or at least, have assistance from someone who does!

THE ET-3400 RE LINE

There seems to be a lot of misunderstanding about use of the RE Line. This line controls a set of two-directional buffers which allow the CPU to either read from RAM or another address or, by changing the direction of the buffer to write to RAM or another address. When the RE line is low, the buffers are in the read direction, and when the RE line is high, the buffers are in the write direction.

The RE line is required by the ETA-3400 add-on, and the line is brought out so the ETA-3400 can control the line and turn the buffers in the direction the ETA-3400 needs for proper operation. The problem here is if you try to add additional memory cards and you tie into the RE line at the Trainer's 40 pin connector, you have two or more RAM's all trying to fight for control of the RE line. If however, we move the diode to each memory card, then each card will be able to use the RE line correctly.

This is also easy to modify. Remove the Diode and the wire that Heathkit has you install in the trainer, and replace it with a wire between the same pins. This is from the RE connector to pins 6 & 35 on the 40 pin connector. Second, open up the ETA-3400 and cut the trace running from the IC 107 pin 1 to pins 6 & 35 on the 40 pin connector. Then install the diode you removed from the trainer over the cut on the trace. It should be installed with the banded end toward IC 107. While you have the ETA-3400 open, cut the trace between pins 15 & 26 of the 40 pin connector. This last cut will free pin 26 for the next step.

VMA LINE REROUTING

In the ET/ETA-3400 system, the VMA line is ANDed with the 02 line by IC 5 and run to the ETA-3400 as the VMA.02. The SS-50 buss requires a seperate VMA line. To do this, cut the trace in the trainer between pins 15 & 26 on the 40 pin connector. This leaves the 02 line on pin 15. Last, run a wire from pin 26 on the 40 pin connector to the VMA output connector on the underside of the trainer.

That completes the mods to the trainer and add-on. Now our 40 pin connectors have pinouts as shown in Fig 3. The original pinouts are shown in Fig. 2.

SYSTEM CHECKOUT

Well, if you've stuck with it this far, you'll want to be sure that you didn't harm anything in any of the steps so far. Locate those 2112's that were supplied with the ET-3400 and the course, and insert them in the IC sockets on the face of the trainer. Next, reconnect the 40 pin ribbon cable between the ET-3400 and the ETA-3400, then close everything up after a final inspection for loose wires, or any other problems. Power-up the system, and use your ET-3400 memory exam/change keys or the terminal and look at addresses A000-A1FF(Hex). If you've done everything OK, you should see good memory at these locations.

If you have a set of memory tests, run the tests on the addresses A000-A1FF(Hex). If you have not yet purchased a set of memory tests, use your SLIDE control and SLIDE out of ROM the memory test at 1A34-1A8E(Hex) in the ETA-3400. I'd suggest you relocate it starting at 0134, by punching in SLIDF 1A34,0134,FF (CR). Next, use your memory exam and change the following:

New Address	From	To
0181	CE 1000	CE 0100
0168	CE 00DF	CE A1FF
016B	8C FFFF	8C A000

Before starting the memory tests, use your memory exam/change and set all of the A000-A1FF(Hex) adresses to 00. Lastly, jump to the memory test which now starts at 0134(Hex) by typing in G 0134 (CR). The altered memory test program will now check your new memory.

WIREWRAPP CARD CONSTRUCTION

Cut a piece of perf-board to 5" X 9" (EWTPCO standard for SS-50 buss cards) and use 5 minute Epoxy to mount 5 each of the 10 pin Molex female connectors on one side (the 9 inch side) of the card. Purchase or fabricate two 40 pin connectors with the same pin spacings as the ones you see on the trainer/add-on. I used two 40 pin wirewrapp IC sockets to make a connector by carefully cutting each of the sockets down the middle, and then gluing what was the outside of the sockets together. Mount the connectors on the top edge of the board with Epoxy, and finally, mount a 14 pin IC socket in the middle of the board.

Once the epoxy is hard, you should use a fine felt-tiped pen, and label one of the 40 pin connectors as "Trainer" and the other as "Add-on". Then transfor to the card all of the pin numbers and uses shown in Figure 4 and list 1.

Lastly, the big job, and that is to wirewrapp up the board following the connections listed in Figure 4. I'd suggest you use one color of wire for data lines, another for the address lines, and so on. This makes it much easier later if you have to correct any mistakes.

CHECKOUT (AGAIN)

Once you are sure you have the wirewrapp board wired up correctly, insert a 7404 in the IC socket on the board. Now disconnect the 40 pin cable connecting the trainer to the add-on. Connect one end of the 40 pin cable to the connector on the board marked "Trainer", and the other to the trainer itself. Connect a second 40 pin cable to the connector on the board marked "Add-on" and the free end of this cable to the add-on itself. Then TRIPPLE CHECK that you have the cable plugs correct, that is pin 1 on the trainer should connect to VMA,02 on the card, ect. It's easy to get these cables 180 out as there isn't any index pin to prevent you from plugging it either way!!

Finally, power up the system WITHOUT THE CARD CONNECTED TO THE SS-50 BUSS. You should find that the trainer and the add-on will operate as before you started with the exception of the fact that you will now have the addition of the Trainer RAMs at A000-A1FF(Hex). If the units don't operate, you have a wiring error on the wirewrapp card. Do not go any further untill you correct any problems!

GETTING THE SS-50 BUSS GOING

I used Thomas Instrumentation memory cards, which are the same pinouts as the Southwest System as shown on List 1, but before connecting the ET/ETA-3400 to your SS-50 buss, it'd be a good idea to go back and recheck your pinouts and signal requirements against those listed. My system only required the inverting of the VMA line and the 02, but yours may be different, and in that case, there are several unused invertors on the 7404 for your use.

SS-50 BUSS LINES

Listing 1 gives you a brief description of the pinouts, names and definitions of the SS-50 buss used by Southwest and most companies using the SS-50 buss. Once you have re-checked your memory card requirements against it, you can plug your wirewrapp card into the SS-50 buss. Make sure to plug the INDEX pin to prevent insertion of the card into the buss incorrectly.

With your wirewrapp card plugged into the SS-50 buss, but without any other cards plugged into the buss, power-up the ET/ETA-3400 and check to be sure it operates normally. IF NOT, check the SS-50 buss and correct the problem.

Once you pass this test, set your memory card addressing switches or jumpers to any address between 2400 and 8000 (Hex), and plug the memory card into the buss. Before you do so, check to make sure there is a plug in the correct hole of the card marked INDEX. Power-up the SS-50 buss, but not the ET/ETA-3400 and check the voltage across the +12V, -12V, and +8V lines to GND. These voltages can vary by -+20% and still be acceptable. Next, check the voltages on your memory cards. These should be +-5% for the card to work correctly. If you find any high or low voltages, be sure to correct them before going to the next step. If you have a friend who has a SS-50 buss computer, the ideal set up would be for you to ask his help, and if possible have him test your memory board in his computer.

THE RE LINE (AGAIN)

Almost done! Consult the data that came with your memory card, and locate the data buffers on the schematic. On most cards there will be two buffers, one for D0-D3, and one for D4-D7 just like the ET-3400. If your buffers have two enable lines, one low to read and another to write, you're in luck. Simply connect a diode simular to the one now relocated in the ETA-3400 (a GD510) to the pin that goes low for a READ. The banded end should be nearest the IC. Connect the other end of the diode to UD2 pin which connects to the RE Line. If your memory cards use one line like the ET-3400, that is high to write and low to read, you may have to invert the signal using one of the spare 7404s on the wirewrapp card.

If all else fails, do as I did, and connect the diode to first one pin and then the other on the memory card buffer untill you find the one that works! On the Thomas 24K RAM card, the correct pin is IC 105 pin 8.

IT'S UP!!

Once you have the card operating, run memory tests, and/or use the program in the first of this article. You'll have to change the address to match those on your card.

SOFTWARE

As it comes from Heathkit, the ETA-3400 is set to use 0000-23FF(Hex). Any memory you add will have to be higher than this. This is not too limiting untill you start getting more than 4-8K of memory. Most of the good programs written for this much memory assume you have free and usable memory from 0000 and up.

If you would like to free the memory from 0000-0800(Hex), you will have to seriously consider rewriting the ETA-3400 monitor ROM, and then burn it into EPROM which can be set to E000(Hex) and up. To work on the program use the SLIDE and move the Monitor program to RAM. It will be then up to you to change all of the 3 BYTE instructions to the new address of your EPROM. Most of the data that needs to be changed is easy to spot, just use your "I" command, and go thru the program. One "hidden" piece of data that is not a 3 BYTE instruction is at 1482(Hex) C6 14. This is the MSB of the return address, and should be changed to the MSB of your EPROM's address. The address table must also be rewritten to the new address. Lastly, you'll have to work to readdress the PIA, which is now at 1000(Hex).

One word of caution, even after you reburn your monitor to EPROM, and locate it above the free memory, the ETA-3400s monitor makes heavy use of the 00 page, 0000-00FF(Hex) and this will require rewriting some of the commercially available programs because of addressing conflicts.

THE END

In conclusion, I should say thanks again to James Greger for all of his assistance. It's been fun and educational, and kept me out of the bars on the weekends! If you like to work with hardware, I hope you'll try these ideas. You can write me for assistance, but please enclose an 18 cent SASE with your letter. Good luck!

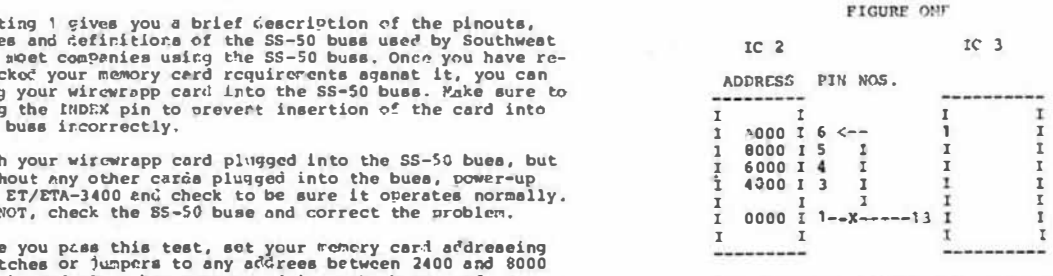
PAGE SIX

Interface your Heathkit ET/ETA-3400 to a SS-50 buss.

George H. Kelm; P.O. Box 160; Yap, Caroline Is., TT 96943

READDRESSING THE TRAINER RAM's IC 14-17

FIGURE ONE



Cut the trace at X and jumper from IC 3 pin 13 to a pin on IC 2 which gives you the address you need for your system.

FIGURE TWO

PIN ASSIGNMENTS BEFORE MODIFICATIONS

40 PIN CONNECTORS ON

TRAINER				MEMORY ADD-ON			
	40	1			40	1	
+12	I*	*I	VMA,02	NC	I*	*I	VMA,02
-12	I*	*I	RESET	NC	I*	*I	RESET
D0	I*	*I	TSC	D0	I*	*I	NC
D1	I*	*I	BA	D1	I*	*I	NC
D2	I*	*I	R/W	D2	I*	*I	R/W
RE	I*	*I	RE	RE	I*	*I	RE
D3	I*	*I	NMI	D3	I*	*I	NC
D4	I*	*I	IRQ	D4	I*	*I	NC
D5	I*	*I	HALT	D5	I*	*I	NC
D6	I*	*I	+5	D6	I*	*I	NC
D7	I*	*I	GND	D7	I*	*I	GND
A0	I*	*I	A15	A0	I*	*I	A15
A1	I*	*I	A14	A1	I*	*I	A14
A2	I*	*I	A13	A2	I*	*I	A13
02	I*	*I	02	02	I*	*I	02
A3	I*	*I	A12	A3	I*	*I	A12
A4	I*	*I	A11	A4	I*	*I	A11
A5	I*	*I	A10	A5	I*	*I	A10
A6	I*	*I	A9	A6	I*	*I	A9
A7	I*	*I	A8	A7	I*	*I	A8

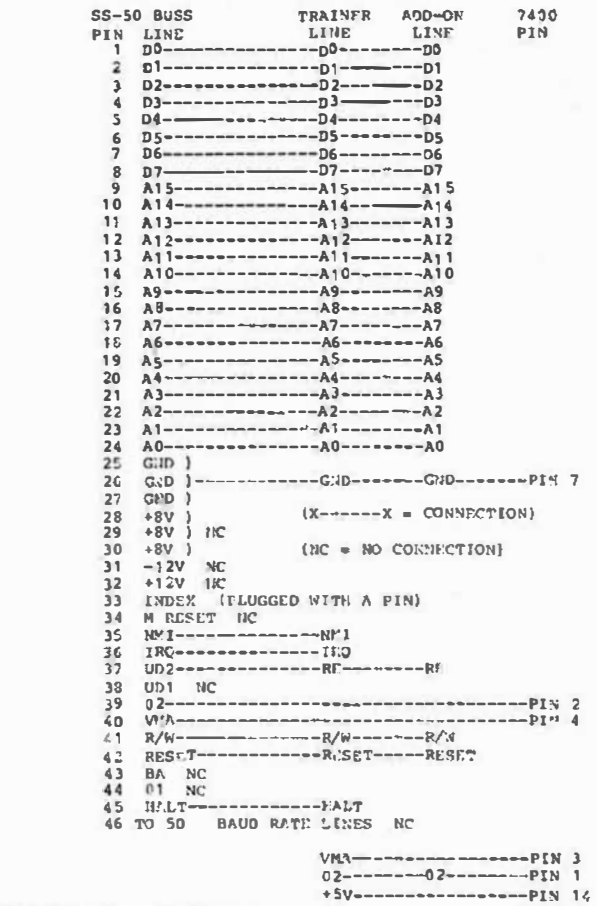
FIGURE THREE

PIN ASSIGNMENTS AFTER MODIFICATIONS

40 PIN CONNECTORS ON

TRAINER				MEMORY ADD-ON			
	40	1			40	1	
+12	I*	*I	VMA,02	NC	I*	*I	VMA,02
-12	I*	*I	RESET	NC	I*	*I	RESET
D0	I*	*I	TSC	D0	I*	*I	NC
D1	I*	*I	BA	D1	I*	*I	NC
D2	I*	*I	R/W	D2	I*	*I	R/W
RE	I*	*I	RE	RE	I*	*I	RE
D3	I*	*I	NMI	D3	I*	*I	NC
D4	I*	*I	IRQ	D4	I*	*I	NC
D5	I*	*I	HALT	D5	I*	*I	NC
D6	I*	*I	+5	D6	I*	*I	NC
D7	I*	*I	GND	D7	I*	*I	GND
A0	I*	*I	A15	A0	I*	*I	A15
A1	I*	*I	A14	A1	I*	*I	A14
A2	I*	*I	A13	A2	I*	*I	A13
VMA	I*	*I	02	NC	I*	*I	02
A3	I*	*I	A12	A3	I*	*I	A12
A4	I*	*I	A11	A4	I*	*I	A11
A5	I*	*I	A10	A5	I*	*I	A10
A6	I*	*I	A9	A6	I*	*I	A9
A7	I*	*I	A8	A7	I*	*I	A8

FIGURE FOUR WIREWRAPP CARD PINOUTS/CONNECTIONS



LISTING ONE SS-50 PINOUT DESIGNATIONS

PIN NO.	SIGNAL	DESCRIPTION
1 TO 8	D0 TO D7	Data Buss Lines. Complement of the 6800 data lines (inverted).
9 TO 24	A0 TO A15	Address Lines. Same as ET-3400.
25 TO 27	GND	Ground return line for power.
28 TO 30	+8V	+8 VDC supply line.
31	-12V	-12 VDC supply line.
32	+12V	+12 VDC supply line.
33	INDEX	A plugged pin hole to prevent incorrect insertion of boards.
34	M RESET	Manual Reset. Active low. In-out to a oneshot which inturn outputs pulse to reset CPU.
35	NMI	Nonmaskable Interrupt. Active low. Same as ET-3400.
36	IRQ	Interrupt Request. Active low. Same as ET-3400.
37 TO 38	UD1 & 2	User Defined lines. UD2 is used here for the RF line.
39	02	Clock 2 line. Inverted.
40	VMA	Valid Memory Address. Inverted. Same as ET-3400.
41	R/W	Read/Write line. High for a read, low for a write.
42	RESET	Reset line. This is the output of the oneshot (M RESET).
43	BA	Bus Available. Same as ET-3400.
44	01	Clock 1 line. Same as ET-3400.
45	HALT	Halt line. Active low. Same as ET-3400.
46 TO 50	110 TO 1200	Baud lines. Used for ACIA timing in the SW System.

Mailing Package

This software enables the computer operator to send out business letters and envelopes such as would accompany a resume for a job search in a more personal manner. There are seven programs which include COVLET, ENVELOPE, SEARCVLT, SEARENVL, SREXAMZP, SRCVLTZP, and SRENVLZP. These programs operate on a file called DATCOMP which contains the pertinent information:

1) the name of the company
2) the name of the individual to be contacted
3) the above person's title
4) the department
5) the street address
6) the city, state and zip code.

The computer operator is assumed to have prepared the master copy of the letter he/she intends to mail out and to have made photolithographed copies which only require the addition of the date, heading, and greeting. Size 10 envelopes are to be used and may or may not have the computer operator's name and address in the upper left hand corner.

COVLET prints to the companies contained in DATCOMP a letter for all companies one company after another. ENVELOPE prints to the companies contained in DATCOMP an envelope for all companies one company after another. SEARCVLT permits a search for a particular company and then it is possible to print the date, heading, and greeting to that company and to the companies which follow the sought for company. This is useful if the entire contents of DATCOMP were not printed at one sitting and one wishes to print the remainder of the letters to the companies. SEARENVL permits a search for a particular company and then it is possible to print the name and address to that company and to the companies that follow the sought for company. This is useful if the entire contents of DATCOMP were not printed at one sitting and one wishes to print the remainder of the envelopes to the companies. SEARCVLT and SEARENVL also permit one to locate the line numbers in the BASIC program DATCOMP where the particular company resides in order that the DATCOMP file may be changed and updated.

SREXAMZP allows the computer operator to examine DATCOMP by zip code in as general a manner as the first leading digit or as specific a manner as a full five digits. Hardcopy of the sought for companies may be produced. SRCVLTZP allows one to print letters to companies by means of a search similar to that conducted for SREXAMZP. SRENVLZP allows one to print envelopes to companies by means of a search similar to that conducted for SREXAMZP.

To use the mailing package, one loads the master program and then appends the DATCOMP file to it. DATCOMP files start at line 1100 and follow the format shown in the example.

It is estimated that letters and envelopes can be produced at a rate of 500 per twelve hour period.

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Chicago, IL 60616

```
0010 REM ***** COPYRIGHT 1980 JEFFREY M. CRAIG *****
0020 REM ***** M A I L I N G  P A C K A G E *****
0030 REM ***** COVLET *****
0040 LINE= 0
0050 PRINT "THIS PROGRAM TYPES THE DATE, COMPANY AND ADDRESS,"
0060 PRINT "AND GREETING TO SUCCESSIVE ADDRESSES"
0070 PRINT "LISTED IN DATA STATEMENTS."
0080 PRINT
0090 PRINT "INPUT TAB SPACING OF DATE"
0100 INPUT D1
0110 PRINT "INPUT TAB SPACING OF ADDRESSEE AND GREETING"
0120 INPUT Z
0130 PRINT "ENTER THE DATE"
0140 PRINT "ENTER DAY,THEN MONTH, THEN YEAR IN THAT ORDER"
0150 INPUT D,M$,Y
0160 PRINT "ENTER THE VERTICAL SPACING BETWEEN"
0170 PRINT "THE DATE AND THE LETTER'S ADDRESSEE"
0180 INPUT A1
0190 PRINT "ENTER THE VERTICAL SPACING BETWEEN"
0200 PRINT "ADDRESSEE AND GREETING"
0210 INPUT B1
0220 PRINT "ENTER 'P' IF YOU WANT OUTPUT TO A PRINTER"
0230 PRINT "ENTER ANY OTHER CHARACTER IF YOU WANT CRT"
0240 INPUT P$
0250 IF P$<>"P" THEN GOTO 270
0260 PORT= 7
0270 READ A$,B$,C$,D$,E$,F$,G$,H$
0280 IF A$="SEARCH WILL CONTINUE" THEN GOTO 770
0290 PRINT TAB(D1);M$;" ";D;",";Y
0300 FOR X=1 TO A1
0310 PRINT
0320 NEXT X
0330 IF B$="sir" THEN GOTO 350
0340 PRINT TAB(Z);B$;" ";C$;" ";D$
0350 IF LEFT$(E$,3)="---" THEN GOTO 370
0360 PRINT TAB(Z);E$
0370 IF LEFT$(F$,3)="---" THEN GOTO 390
0380 PRINT TAB(Z);F$
0390 PRINT TAB(Z);G$
0400 IF LEFT$(G$,3)="---" THEN GOTO 420
0410 PRINT TAB(Z);G$
0420 PRINT TAB(Z);H$
0430 FOR X=1 TO B1
0440 PRINT
0450 NEXT X
0460 IF B$="sir"  THEN GOTO 550
0470  Y$=RIGHT$(D$,3)
0480  Z$=LEFT$(D$,LEN(D$)-3)
0490 IF Y$="III" THEN D$=Z$
0500 IF Y$=" II" THEN D$=Z$
0510 IF Y$="Jr." THEN D$=Z$
0520 IF Y$="Sr." THEN D$=Z$
0530 PRINT TAB(Z);"Dear ";B$;" ";D$;":"
0540 GOTO 560
0550 PRINT TAB(Z);"Dear ";B$;":"
0560 REM : THE BULK OF THE FORM LETTER FOLLOWS
0570 REM
0580 REM
0590 PORT= 1
0600 PRINT
0610 PRINT
0620 PRINT "DO YOU WANT TO REPEAT THE PREVIOUS COMPANY?"
0630 PRINT "ENTER 'Y' FOR YES OR ANY OTHER CHARACTER FOR NO."
0640 PRINT "TO EXIT PROGRAM ENTER CONTROL C."
0650 INPUT W$
0660 IF W$<>"Y" THEN GOTO 250
0670 IF P$="P" THEN PORT= 7
0680 GOTO 290
0690 REM : A$=NAME OF THE COMPANY
0700 REM : B$=Mr.,Mrs.,Ms., or sir
0710 REM : C$=FIRST NAME AND MIDDLE INITIAL
0720 REM : D$=LAST NAME
0730 REM : E$=TITLE OF INDIVIDUAL
0740 REM : F$=NAME OF LAB OR R&D
0750 REM : G$=STREET ADDRESS
0760 REM : H$=CITY, STATE, AND ZIP CODE
0770 PORT= 1
0780 PRINT "ENTIRE CONTENTS OF FILE HAVE BEEN PRINTED"
0790 END
```

```
0010 REM ***** COPYRIGHT 1980 JEFFREY M. CRAIG *****
0020 REM ***** M A I L I N G  P A C K A G E *****
0030 REM ***** E N V E L O P E *****
0040 LINE= 0
0050 PRINT "THIS PROGRAM PRINTS SIZE 10 ENVELOPES TO COMPANIES"
0060 PRINT "FROM DATA STATEMENTS."
0070 PRINT
0080 PRINT "DO YOU WANT ADDRESS IN UPPER LEFT"
0090 PRINT "CORNER OF ENVELOPE?"
0100 PRINT "ENTER 'Y' FOR YES"
0110 PRINT "ENTER ANY OTHER CHARACTER FOR NO"
0120 INPUT L$
0130 PRINT
0140 PRINT "DO YOU WANT OUTPUT TO THE PRINTER?"
0150 PRINT "ENTER 'P' IF YOU WANT PRINTER"
0160 PRINT "ENTER ANY OTHER CHARACTER IF YOU WANT CRT"
0170 INPUT P$
0180 IF L$<>"Y" THEN GOTO 310
0190 PRINT "ENTER NAME AND ADDRESS TO APPEAR IN"
0200 PRINT "UPPER LEFT CORNER OF ENVELOPE"
0210 PRINT "### MAKE SURE YOU ENTER NO COMMAS ###"
0220 PRINT
0230 PRINT "ENTER THE NAME"
0240 INPUT N$
0250 PRINT
0260 PRINT "ENTER THE STREET ADDRESS"
0270 INPUT S$
0280 PRINT
0290 PRINT "ENTER THE CITY, STATE AND ZIP CODE"
0300 INPUT Z$
0310 READ A$,B$,C$,D$,E$,F$,G$,H$
0320 IF A$="SEARCH WILL CONTINUE" THEN GOTO 620
0330 IF P$<>"P" THEN GOTO 350
0340 PORT= 7
0350 IF L$<>"Y" THEN GOTO 420
0360 PRINT N$
0370 PRINT S$
0380 PRINT Z$
0390 FOR X=1 TO 4
0400 PRINT
0410 NEXT X
0420 IF B$="sir" THEN GOTO 440
0430 PRINT TAB(30);B$;" ";C$;" ";D$
0440 IF LEFT$(E$,3)="---" THEN GOTO 460
0450 PRINT TAB(30);E$
0460 IF LEFT$(F$,3)="---" THEN GOTO 480
```

```
0470 PRINT TAB(30);F$
0480 PRINT TAB(30);A$
0490 IF LEFT$(G$,3)="---" THEN GOTO 510
0500 PRINT TAB(30);G$
0510 PRINT TAB(30);H$
0520 PORT= 1
0530 PRINT
0540 PRINT
0550 PRINT "DO YOU WANT TO REPEAT THE PREVIOUS COMPANY?"
0560 PRINT "IF YES THEN ENTER 'Y' IF NO ENTER ANY OTHER CHARACTER."
0570 PRINT "PROGRAM CAN BE EXITED BY ENTERING CONTROL C."
0580 INPUT W$
0590 IF W$<>"Y" THEN GOTO 310
0600 IF P$="P" THEN PORT= 7
0610 GOTO 350
0620 PORT= 1
0630 PRINT "THE ENTIRE CONTENTS OF FILE HAVE BEEN PRINTED"
0640 END

10 REM ***** COPYRIGHT 1980 JEFFREY M. CRAIG *****
20 REM ***** M A I L I N G  P A C K A G E *****
30 REM ***** S E A R C H  V E R S I O N *****
40 LINE= 0
50 PRINT "THIS PROGRAM PRINTS THE DATE, ADDRESS, AND"
60 PRINT "GREETING ON A COVER LETTER BY SEARCHING"
70 PRINT "THROUGH DATA FILES FOR THE COMPANY THE"
80 PRINT "WRITER SELECTS"
90 PRINT
100 PRINT "ENTER TAB SPACING OF THE DATE"
110 INPUT D1
120 PRINT
130 PRINT "ENTER TAB SPACING OF ADDRESSEE AND GREETING"
140 INPUT I
150 PRINT
160 PRINT "### ENTER THE DATE ###"
170 PRINT "ENTER DAY, THEN MONTH, THEN YEAR IN THAT ORDER"
180 INPUT D,M$,Y
190 PRINT
200 PRINT "ENTER THE VERTICAL SPACING BETWEEN"
210 PRINT "THE DATE AND ADDRESSEE"
220 INPUT A1
230 PRINT
240 PRINT "ENTER THE VERTICAL SPACING BETWEEN"
250 PRINT "ADDRESSEE AND GREETING"
260 INPUT B1
270 GOTO 300
280 RESTORE
290 LET Y$="NONE"
300 PRINT "ENTER THE COMPANY NAME YOU WANT SEARCHED"
310 PRINT "### OR ENTER 'DONE' TO END SEARCH ###"
320 INPUT X$
330 IF X$="DONE" THEN GOTO 1060
340  X$(1)=LEFT$(X$,1)
350  X$(2)=LEFT$(X$,2)
360  X$(3)=LEFT$(X$,3)
370 FOR X=1100 TO 9000 STEP 70
380 READ A$,B$,C$,D$,E$,F$,G$,H$
390 IF Y$="Y" THEN GOTO 430
400  A$(1)=LEFT$(A$,1)
410  A$(2)=LEFT$(A$,2)
420  A$(3)=LEFT$(A$,3)
430 IF A$="SEARCH WILL CONTINUE" THEN GOTO 1030
440 IF Y$="Y" THEN GOTO 480
450 IF X$(1)<>A$(1) THEN GOTO 1020
460 IF X$(2)<>A$(2) THEN GOTO 1020
470 IF X$(3)<>A$(3) THEN GOTO 1020
480 PRINT "LINES ";X;" THROUGH ";X+60
490 PRINT :PRINT A$
500 IF B$="sir" THEN GOTO 520
510 PRINT B$:PRINT C$:PRINT D$
520 IF LEFT$(E$,3)="---" THEN GOTO 540
530 PRINT E$
540 IF LEFT$(F$,3)="---" THEN GOTO 560
550 PRINT F$
560 IF LEFT$(G$,3)="---" THEN GOTO 580
570 PRINT G$
580 PRINT H$
590 PRINT
600 PRINT "DO YOU WANT OUTPUT TO THE PRINTER?"
610 PRINT "ENTER 'P' IF YOU WANT PRINTER"
620 PRINT "ENTER ANY OTHER CHARACTER IF YOU WANT CRT"
630 PRINT "ENTER CONTROL C TO EXIT PROGRAM AT ANY TIME."
640 INPUT P$
650 IF Y$="Y" THEN GOTO 720
660 PRINT "DO YOU WANT TO CONTINUE PRINTING"
670 PRINT "THE REST OF THE COMPANIES"
680 PRINT "FOLLOWING THE COMPANY YOU HAVE ENTERED?"
690 PRINT "IF YES ENTER 'Y'. IF NO ENTER ANY OTHER CHARACTER."
700 PRINT "ENTER CONTROL C TO EXIT PROGRAM AT ANY TIME."
710 INPUT Y$
720 IF P$<>"P" THEN GOTO 1020
730 PORT= 7
740 PRINT TAB(D1);M$;" ";D;",";Y
750 FOR V=1 TO A1
760 PRINT
770 NEXT V
780 IF B$="sir" THEN GOTO 800
790 PRINT TAB(I);B$;" ";C$;" ";D$
800 IF LEFT$(E$,3)="---" THEN GOTO 820
810 PRINT TAB(I);E$
820 IF LEFT$(F$,3)="---" THEN GOTO 840
830 PRINT TAB(I);F$
840 PRINT TAB(I);A$
850 IF LEFT$(G$,3)="---" THEN GOTO 870
860 PRINT TAB(I);G$
870 PRINT TAB(I);H$
880 FOR W=1 TO B1
890 PRINT
900 NEXT W
910 IF B$="sir" THEN GOTO 1000
920  X$=RIGHT$(D$,3)
930  Z$=LEFT$(D$,LEN(D$)-3)
940 IF X$="III" THEN D$=Z$
950 IF X$=" II" THEN D$=Z$
960 IF X$="Jr." THEN D$=Z$
970 IF X$="Sr." THEN D$=Z$
980 PRINT TAB(I);"Dear ";B$;" ";D$;":"
990 GOTO 1010
1000 PRINT TAB(I);"Dear ";B$;":"
1010 PORT= 1
1020 NEXT X
1030 PORT= 1
1040 PRINT "THE FILE HAS BEEN EXHAUSTED"
1050 GOTO 280
1060 PORT= 1
1070 PRINT "YOU HAVE EXITED PROGRAM"
```

```
1080 PRINT "TYPE 'RUN' TO CALL UP PROGRAM"
1090 END

0010 REM ***** COPYRIGHT 1980 JEFFREY M. CRAIG *****
0020 REM ***** M A I L I N G   P A C K A G E *****
0030 REM ***** S E A R E N V L *****
0040 LINE= 0
0050 PRINT "THIS PROGRAM PRINTS ENVELOPES (SIZE 10)"
0060 PRINT "TO COMPANIES BY SEARCHING THROUGH A DATA FILE"
0070 PRINT "FOR A COMPANY YOU WILL BE REQUESTED TO ENTER."
0080 PRINT
0090 PRINT "DO YOU WANT YOUR ADDRESS TO APPEAR IN UPPER LEFT"
0100 PRINT "CORNER OF ENVELOPE?"
0110 PRINT "ENTER 'Y' FOR YES"
0120 PRINT "ENTER ANY OTHER CHARACTER FOR NO"
0130 INPUT L$
0140 PRINT
0150 IF L$<>"Y" THEN GOTO 300
0160 PRINT "ENTER NAME AND ADDRESS TO APPEAR IN"
0170 PRINT "UPPER LEFT CORNER OF ENVELOPE"
0180 PRINT "*** MAKE SURE YOU ENTER NO COMMAS ***"
0190 PRINT
0200 PRINT "ENTER THE NAME"
0210 INPUT N$
0220 PRINT
0230 PRINT "ENTER THE STREET ADDRESS"
0240 INPUT S$
0250 PRINT
0260 PRINT "ENTER THE CITY, STATE AND ZIP CODE"
0270 INPUT Z$
0280 RESTORE
0290 LET Y$="NONE"
0300 PRINT "ENTER THE COMPANY NAME YOU WANT SEARCHED"
0310 PRINT "*** OR ENTER 'DONE' TO END SEARCH ***"
0320 INPUT X$
0330 IF X$="DONE" THEN GOTO 990
0340  X$(1)=LEFT$(X$,1)
0350  X$(2)=LEFT$(X$,2)
0360  X$(3)=LEFT$(X$,3)
0370 FOR X=1100 TO 9000 STEP 70
0380 READ A$,B$,C$,D$,E$,F$,G$,H$
0390 IF Y$="Y" THEN GOTO 430
0400  A$(1)=LEFT$(A$,1)
0410  A$(2)=LEFT$(A$,2)
0420  A$(3)=LEFT$(A$,3)
0430 IF A$="SEARCH WILL CONTINUE" THEN GOTO 960
0440 IF Y$="Y" THEN GOTO 480
0450 IF X$(1)<>A$(1) THEN GOTO 950
0460 IF X$(2)<>A$(2) THEN GOTO 950
0470 IF X$(3)<>A$(3) THEN GOTO 950
0480 PRINT "LINES ";X;" THROUGH ";X+60
0490 PRINT
0500 PRINT A$
0510 IF B$="sir" THEN GOTO 550
0520 PRINT B$
0530 PRINT C$
0540 PRINT D$
0550 IF LEFT$(E$,3)="---" THEN GOTO 570
0560 PRINT E$
0570 IF LEFT$(F$,3)="---" THEN GOTO 590
0580 PRINT F$
0590 IF LEFT$(G$,3)="---" THEN GOTO 610
0600 PRINT G$
0610 PRINT H$
0620 PRINT
0630 PRINT "DO YOU WANT OUTPUT TO THE PRINTER?"
0640 PRINT "ENTER 'P' IF YOU WANT PRINTER"
0650 PRINT "ENTER ANY OTHER CHARACTER IF YOU WANT CRT"
0660 PRINT "ENTER CONTROL C TO EXIT PROGRAM AT ANY TIME."
0670 INPUT P$
0680 IF Y$="Y" THEN GOTO 750
0690 PRINT "DO YOU WANT TO CONTINUE PRINTING"
0700 PRINT "THE REST OF THE COMPANIES"
0710 PRINT "FOLLOWING THE COMPANY YOU HAVE ENTERED?"
0720 PRINT "IF YES ENTER 'Y'. IF NO ENTER ANY OTHER CHARACTER."
0730 PRINT "ENTER CONTROL C TO EXIT PROGRAM AT ANY TIME."
0740 INPUT Y$
0750 IF P$<>"P" THEN GOTO 950
0760 PORT= 7
0770 IF L$<>"Y" THEN GOTO 840
0780 PRINT N$
0790 PRINT S$
0800 PRINT Z$
0810 FOR V=1 TO 4
0820 PRINT
0830 NEXT V
0840 IF B$="sir" THEN GOTO 860
0850 PRINT TAB(30);B$;" ";C$;" ";D$
0860 IF LEFT$(E$,3)="---" THEN GOTO 880
0870 PRINT TAB(30);E$
0880 IF LEFT$(F$,3)="---" THEN GOTO 900
0890 PRINT TAB(30);F$
0900 PRINT TAB(30);A$
0910 IF LEFT$(G$,3)="---" THEN GOTO 930
0920 PRINT TAB(30);G$
0930 PRINT TAB(30);H$
0940 PORT= 1
0950 NEXT X
0960 PORT= 1
0970 PRINT "THE FILE HAS BEEN EXHAUSTED"
0980 GOTO 280
0990 PORT= 1
1000 PRINT "YOU HAVE EXITED PROGRAM"
1010 PRINT "TYPE 'RUN' TO CALL UP PROGRAM"
1020 END

10 REM ***** JEFFREY M. CRAIG *****
20 REM ***** M A I L I N G  P A C K A G E *****
30 REM ***** S R E X A M Z P *****
40 LINE= 0
50 REM
60 PRINT "THE NAME OF THIS PROGRAM IS SREXAMZP"
70 PRINT "THIS PROGRAM ALLOWS ONE TO EXAM THE CONTENTS'
80 PRINT "OF DATA FILES BY SEARCH FOR A ZIP CODE"
90 PRINT "WHICH YOU WILL BE REQUESTED TO ENTER."
100 PRINT
110 PRINT "THE LINE NUMBERS WHERE THE DATA RESIDES WILL"
120 PRINT "ALSO BE REPORTED TO YOU."
130 PRINT
140 PRINT "YOU MAY THEN DECIDE WHETHER OR NOT TO"
150 PRINT "HAVE HARDCOPY OF THE COMPANY IN THE"
160 PRINT "REGION OF THE COUNTRY YOU HAVE SELECTED."
170 RESTORE
180 PRINT "ENTER FROM ONE TO FIVE LEADING DIGITS"
190 PRINT "OF THE ZIP CODE YOU WANT SEARCHED,"
200 PRINT "OR ENTER 'DONE' TO EXIT PROGRAM."
```

```
210 INPUT X$
220 IF X$="DONE" THEN GOTO 690
230 LET N=LEN(X$)
240 LET X$(1)=LEFT$(X$,N)
250 FOR X=1100 TO 9000 STEP 70
260 READ A$,B$,C$,D$,E$,F$,G$,H$
270  H$(1)=RIGHT$(H$,5)
280 LET H$(2)=LEFT$(H$(1),N)
290 IF A$="SEARCH WILL CONTINUE" THEN GOTO 660
300 IF X$(1)<>H$(2) THEN GOTO 650
310 PRINT "LINES ";X;" THROUGH ";X+60
320 PRINT A$
330 IF B$="sir" THEN GOTO 370
340 PRINT B$
350 PRINT C$
360 PRINT D$
370 IF LEFT$(E$,3)="---" THEN GOTO 390
380 PRINT E$
390 IF LEFT$(F$,3)="---" THEN GOTO 410
400 PRINT F$
410 IF LEFT$(G$,3)="---" THEN GOTO 430
420 PRINT G$
430 PRINT H$
440 PRINT
450 PRINT "DO YOU WANT HARDCOPY OF THE ABOVE NAMED COMPANY?"
460 PRINT "ENTER 'P' IF YOU DO."
470 PRINT "ENTER ANY OTHER CHARACTER IF YOU WANT CRT."
480 INPUT P$
490 IF P$<>"P" THEN GOTO 650
500 PORT= 7
510 PRINT A$
520 IF B$="sir" THEN GOTO 560
530 PRINT B$
540 PRINT C$
550 PRINT D$
560 IF LEFT$(E$,3)="---" THEN GOTO 580
570 PRINT E$
580 IF LEFT$(F$,3)="---" THEN GOTO 600
590 PRINT F$
600 IF LEFT$(G$,3)="---" THEN GOTO 620
610 PRINT G$
620 PRINT H$
630 PRINT
640 PORT= I
650 NEXT X
660 PORT= I
670 PRINT "THE FILE HAS BEEN EXHAUSTED."
680 GOTO 170
690 PRINT "YOU HAVE EXITED PROGRAM"
700 PRINT "TYPE 'RUN' TO RE-ENTER PROGRAM"
710 END

10 REM $$$$$ JEFFREY M. CRAIG $$$$$
20 REM $$$$$ M A I L I N G  P A C K A G E $$$$$
30 REM $$$$$ S R C V L T Z P $$$$$
40 LINE= 0
50 PRINT "THIS PROGRAM PRINTS THE DATE, ADDRESS, AND"
60 PRINT "GREETING ON A COVER LETTER BY SEARCHING"
70 PRINT "THROUGH DATA FILES FOR A ZIP CODE THE"
80 PRINT "WRITER SELECTS"
90 PRINT
100 PRINT "ENTER TAB SPACING OF THE DATE"
110 INPUT DI
120 PRINT
130 PRINT "ENTER TAB SPACING OF ADDRESSEE AND GREETING"
140 INPUT Z
150 PRINT
160 PRINT "$$$ ENTER THE DATE $$$"
170 PRINT "ENTER DAY, THEN MONTH, THEN YEAR IN THAT ORDER"
180 INPUT D,M$,Y
190 PRINT
200 PRINT "ENTER THE VERTICAL SPACING BETWEEN"
210 PRINT "THE DATE AND ADDRESSEE"
220 INPUT AI
230 PRINT
240 PRINT "ENTER THE VERTICAL SPACING BETWEEN"
250 PRINT "ADDRESSEE AND GREETING"
260 INPUT BI
270 GOTO 290
280 RESTORE
290 PRINT "ENTER FROM ONE TO FIVE DIGITS OF THE"
300 PRINT "ZIP CODE YOU WANT SEARCHED."
310 PRINT "$$$ OR ENTER 'DONE' TO END SEARCH $$$"
320 INPUT X$
330 IF X$="DONE" THEN GOTO 950
340 LET N=LEN(X$)
350 LET X$(1)=LEFT$(X$,N)
360 FOR X=1100 TO 9000 STEP 70
370 READ A$,B$,C$,D$,E$,F$,G$,H$
380  H$(1)=RIGHT$(H$,5)
390 LET H$(2)=LEFT$(H$(1),N)
400 IF A$="SEARCH WILL CONTINUE" THEN GOTO 920
410 IF X$(1)<>H$(2) THEN GOTO 910
420 PRINT "LINES ";X;" THROUGH ";X+60
430 PRINT
440 PRINT A$
450 IF B$="sir" THEN GOTO 490
460 PRINT B$
470 PRINT C$
480 PRINT D$
490 IF LEFT$(E$,3)="---" THEN GOTO 510
500 PRINT E$
510 IF LEFT$(F$,3)="---" THEN GOTO 530
520 PRINT F$
530 IF LEFT$(G$,3)="---" THEN GOTO 550
540 PRINT G$
550 PRINT H$
560 PRINT
570 PRINT "DO YOU WANT OUTPUT TO THE PRINTER?"
580 PRINT "ENTER 'P' IF YOU WANT PRINTER"
590 PRINT "ENTER ANY OTHER CHARACTER IF YOU WANT CRT"
600 INPUT P$
610 IF P$<>"P" THEN GOTO 910
620 PORT= 7
630 PRINT TAB(DI);M$;" ";D;",";Y
640 FOR V=1 TO AI
650 PRINT
660 NEXT V
670 IF B$="sir" THEN GOTO 690
680 PRINT TAB(Z);B$;" ";C$;" ";D$
690 IF LEFT$(E$,3)="---" THEN GOTO 710
700 PRINT TAB(Z);E$
710 IF LEFT$(F$,3)="---" THEN GOTO 730
720 PRINT TAB(Z);F$
730 PRINT TAB(Z);A$
740 IF LEFT$(G$,3)="---" THEN GOTO 760
750 PRINT TAB(Z);G$
```

```
760 PRINT TAB(Z);H$
770 FOR N=1 TO B1
780 PRINT
790 NEXT N
800 IF B$="sir" THEN GOTO 890
810  X$=RIGHT$(D$,3)
820  Z$=LEFT$(D$,LEN(D$)-3)
830 IF X$="III" THEN D$=Z$
840 IF X$=" II" THEN D$=Z$
850 IF X$="Jr." THEN D$=Z$
860 IF X$="Sr." THEN D$=Z$
870 PRINT TAB(Z);"Dear ";B$;" ";D$;":"
880 GOTO 900
890 PRINT TAB(Z);"Dear ";B$;":"
900 PORT= 1
910 NEXT X
920 PORT= 1
930 PRINT "THE FILE HAS BEEN EXHAUSTED"
940 GOTO 280
950 PORT= 1
960 PRINT "YOU HAVE EXITED PROGRAM"
970 PRINT "TYPE 'RUN' TO CALL UP PROGRAM"
980 END

10 REM ##### JEFFREY M. CRAIG #####
20 REM ##### M A I L I N G   P A C K A G E #####
30 REM ##### S R E N V L Z P #####
40 LINE= 0
50 PRINT "THIS PROGRAM PRINTS ENVELOPES (SIZE 10)"
60 PRINT "TO COMPANIES BY SEARCHING THROUGH A DATA FILE"
70 PRINT "FOR A LEADING NUMBER IN A PARTICULAR ZIP CODE."
80 PRINT "DO YOU WANT YOUR ADDRESS TO APPEAR IN UPPER LEFT"
90 PRINT "CORNER OF ENVELOPE?"
100 PRINT "ENTER 'Y' FOR YES"
110 PRINT "ENTER ANY OTHER CHARACTER FOR NO"
120 INPUT L$
130 PRINT
140 IF L$<>"Y" THEN GOTO 280
150 PRINT "ENTER NAME AND ADDRESS TO APPEAR IN"
160 PRINT "UPPER LEFT CORNER OF ENVELOPE"
170 PRINT "### MAKE SURE YOU ENTER NO COMMAS ###"
180 PRINT
190 PRINT "ENTER THE NAME"
200 INPUT N$
210 PRINT
220 PRINT "ENTER THE STREET ADDRESS"
230 INPUT S$
240 PRINT
250 PRINT "ENTER THE CITY, STATE AND ZIP CODE"
260 INPUT Z$
270 RESTORE
280 PRINT "ENTER FROM ONE TO FIVE DIGITS OF THE ZIP CODE"
290 PRINT "YOU WANT SEARCHED."
300 PRINT "ENTER 'DONE' IF YOU WANT TO EXIT PROGRAM."
310 INPUT X$
320 IF X$="DONE" THEN GOTO 860
330 LET N=LEN(X$)
340  X$(1)=LEFT$(X$,N)
350 FOR X=1100 TO 9000 STEP 70
360 READ A$,B$,C$,D$,E$,F$,G$,H$
370  H$(1)=RIGHT$(H$,5)
380  H$(2)=LEFT$(H$(1),N)
390 IF A$="SEARCH WILL CONTINUE" THEN GOTO 810
400 IF X$(1)<>H$(2) THEN GOTO 800
410 PRINT "LINES ";X;" THROUGH ";X+60
420 PRINT
430 PRINT A$
440 IF B$="sir" THEN GOTO 490
450 PRINT B$
460 PRINT C$
470 PRINT D$
480 IF LEFT$(E$,3)="---" THEN GOTO 500
490 PRINT E$
500 IF LEFT$(F$,3)="---" THEN GOTO 520
510 PRINT F$
520 IF LEFT$(G$,3)="---" THEN GOTO 540
530 PRINT G$
540 PRINT H$
550 PRINT
560 PRINT "DO YOU WANT OUTPUT TO THE PRINTER?"
570 PRINT "ENTER 'P' IF YOU WANT PRINTER"
580 PRINT "ENTER ANY OTHER CHARACTER IF YOU WANT CRT"
590 INPUT P$
600 IF P$<>"P" THEN GOTO 900
610 PORT= 7
620 IF L$<>"Y" THEN GOTO 690
630 PRINT N$
640 PRINT S$
650 PRINT Z$
660 FOR V=1 TO 4
670 PRINT
680 NEXT V
690 IF B$="sir" THEN GOTO 710
700 PRINT TAB(30);B$;" ";C$;" ";D$
710 IF LEFT$(E$,3)="---" THEN GOTO 730
720 PRINT TAB(30);E$
730 IF LEFT$(F$,3)="---" THEN GOTO 750
740 PRINT TAB(30);F$
750 PRINT TAB(30);A$
760 IF LEFT$(G$,3)="---" THEN GOTO 780
770 PRINT TAB(30);G$
780 PRINT TAB(30);H$
790 PORT= 1
800 NEXT X
810 PORT= 1
820 PRINT "THE FILE HAS BEEN EXHAUSTED"
830 PRINT
840 PRINT
850 GOTO 270
860 PORT= 1
870 PRINT "YOU HAVE EXITED PROGRAM"
880 PRINT "TYPE 'RUN' TO CALL UP PROGRAM"
890 END
1100 DATA "Smith Brothers Co."
1110 DATA "Mr.","James B."
1120 DATA "Smith"
1130 DATA "Personnel"
1140 DATA "Research and Development"
1150 DATA "10 Smith St."
1160 DATA "San Antonio, TX 00000"
1170 DATA "Jones Textile Mills"
1180 DATA "Mr.","John C."
1190 DATA "Knitter III"
1200 DATA "Manager"
1210 DATA "Undergarment Research"
1220 DATA "1001 Shady Lane"
```

```
1230 DATA "Atlanta, GA 00000"
1240 DATA "Porkbellies Unlimited"
1250 DATA "sir","  "
1260 DATA "  "
1270 DATA "Marketing"
1280 DATA "Restaurant Division"
1290 DATA "250 Schwine Dr."
1300 DATA "Asheville, NC 00000"
1310 DATA "Happy Hamburger Huts Inc."
1320 DATA "Mr.","J.P."
1330 DATA "Smiley Jr."
1340 DATA "President"
1350 DATA "French Fries Division"
1360 DATA "891 Madison Ave."
1370 DATA "Chicago, IL 00000"
1380 DATA "Snickerdoodle Cookie Company"
1390 DATA "sir","---"
1400 DATA "---"
1410 DATA "---"
1420 DATA "---"
1430 DATA "---"
1440 DATA "Los Alamos, NM 10000"
1450 DATA "SEARCH WILL CONTINUE"
1460 DATA "  ","  "
1470 DATA "  "
1480 DATA "  "
1490 DATA "  "
1500 DATA "  "
1510 DATA "  "
1520 END
```

THE Speaker

A novel and useful new product has arrived for the Standard S50 Bus and Color Computer, the ALFORD and ASSOCIATES VS-1 SPEAKER. This unit is a voice synthesizer which will provide almost unlimited human speech capability. By the practice of phoneme coding, very intelligent speech can be stored and recited back, by the computer, in short order and with a minimum amount of RAM or ROM overhead. The unit is ideal for 'canned messages' and other applications where a spoken only or in conjunction with a visual response is desired. By 'fine tuning' the code, the speech can be made very 'human' like.

The unit is a 30 pin wired and tested board that installs on the normal 30 pin I/O bus section, of the Standard S50 Bus computer or the side access slot of the Color Computer. It comes complete with a very comprehensive manual covering the art of synthesis methods for duplicating human speech, phonemes and what they are and how the human vocal tract forms these sounds, hardware installation, software instructions for the speaker, configuration for the supplied VOX Editor, printer use with the editor (FLEX™ - SSB™ and others), VOX editor description and command descriptions, Iphone a telephone answering program (source), software utilization for various BASIC's, a detailed hardware description of the unit, circuit drawing and board outlines, parts list and an appendix of many precoded words (makes learning a lot simpler).

SYNTHESIS METHODS

The documentation covers several methods of synthesizing the human voice. The first method is by sampling an actual voice input and storing it as a digital bit. This method probably produces the closest to actual human voice, but the disadvantages of complex hardware and use of vast amounts of memory make it somewhat less desirable than the system used by this board. The second method is a variation of the above allowing an unlimited vocabulary, by storing the elements of spoken words (phonemes), and then having the output device (normally a computer) reconstruct them into vocal words, phrases and sentences. This is an improvement over the above but still uses far too much storage (memory) space. The third method (used by the Alford VS-1 Speaker) is an improvement of the second. Esssentially what is done is this; a model of the human vocal tract is emulated by hardware and software to produce speech. This review cannot provide the space to go into a detailed paper on this method, suffice to say that the giant steps in integrated circuit design has made such efforts possible and available now, to the average computer user. Basically it involves a combination of an electronic model of the human vocal tract, control code ROM and latches and logic in a single IC (SC-01) to implement a device to generate a single phoneme for each byte sent by the computer.

An example of the following sounds and the code to produce them illustrates the simplicity of speech generation:

The word 'FATHER' would be coded as follows:

If by using this system we coded the word FATHER we could write the sound of 'a' as 'AH1'. The 1 indicates the duration of the sound, the AH the type of sound we desire, such as the broad 'a' as in FATHER. By using the supplied charts the word would be constructed as follows:

F AH1 THV ER

Also we might want to include speech inflection or pitch. The inflection or pitch symbol used is the'/'. So we would then code it as follows:

1/F 1/AH1 2/THV 3/ER

Now the word takes on a question inflection and would sound as 'Father?'. The spaces in the above code may be replaced by the comma.

1/F,1/AH1,2/THV,3/ER

Actually it is much simpler than the above would suggest. By using the table of words supplied it becomes increasingly easier to code more complex words and sentences. This 'shorthand' type of coding allows words, with the proper inflection, to be coded quickly. Also the editor allows the user to hear the word as soon as it is coded. This sure makes things a lot nicer, during a phoneme coding session.

SOFTWARE SUPPLIED

The first software package supplied (make sure you specify the type disk system - FLEX - SSB) we will look at is the VOX EDITOR. This editor entails a comprehensive speech editing program. After configuring the editor to suit you system, terminal and printer, a one time function, you will be able to develop phoneme code in an orderly and simple manner.

The commands are:

E - Edit Function
M - Move Functions
S - Speech Functions
D - Disk Functions

When in one of the functions you will be

prompted for additional commands. Speech text commands include (I)sert, (A)dd, (D)elete, (E)dit, (N)umerics or (P)rint?

The process is a buffer editing process and you may insert lines, words or characters at will, when satisfied you may save the buffer to disk or test it by having the editor send it out to your speaker (not included). The insert command allows the insertion of the edited word before the current word pointer in the buffer. The Add command adds the word to the end of the text you are editing. The Delete command deletes the current word. The Edit command allows editing of the pointed word in the buffer. Numerics display the hexidecimal and decimal of the current word. This is great for assembler and BASIC programmers. Print gives a hard copy of the entire text you are editing.

MOVEMENT COMMANDS

By keying 'M' you enter the MOVEMENT command portion of the program. The 'R' command returns you from this mode. The MOVEMENT commands are (F)oreward which moves the word pointer one word toward the end of the text file. (B)ackward does just the opposite. (S)tart moves the pointer to the beginning of the buffer. (E) moves the pointer to the end of the buffer.

SPEECH COMMANDS

While in an editing session it is sometimes desirable to have the computer speak the text for test purposes (or in my case JUST FOR FUN). The (S)peak command has the following sub-command functions. (T)his speaks the word pointed to (current word). (U)p speaks everything from the start of the buffer up to and including the current pointed word. (H)ere speaks from the current word to the end of the buffer. (A)ll speaks the entire buffer. (R)eturns to the main editor program.

DISK COMMANDS

The command (D)isk calls the disk handling routines of the editor. THe (S)ave command saves the entire buffer. (L)oad allows a previously saved text code file to be loaded. This command clears the buffer prior to execution. (A)ppend allows a saved file to be appended to the current buffer, without disturbing the current buffer or it's contents. Again (R)eturn gets us back to the main editing program.

Included is a telephone answering program that is used at Alford Associates to answer their telephone. The code is on the disk that comes with the SPEAKER board. It is an interrupt driven program that works in foreground; it's operation is transparent to the computer operator. This means that your phone can answer, wait for you to answer and give a message to the caller, all while you are still typing away on the keyboard. You will only detect a pause while the disk unloads the iphone program (unless you vector the interrupt to the program located in protected RAM) and then you may continue with normal DOS operations. Care should be exercised concerning other devices on the system that also generate interrupts.

In addition to the detailed hardware section of the manual there is a section concerning points on programming in machine, assembler or BASIC (could apply equally for practically any other language).

The introduction of the SPEAKER board by Alford and Associates (see advertising this issue) brings to the Standard S50 Bus and Color Computer community a new and innovative product. Fun for the hobbyist and a meaningful tool to the business and more serious user.

The board is of excellent quality and comes wired and tested with sockets for all IC's. Dip switch selection makes things a lot simpler. All that is needed to complete the package is a speaker or audio amplifier system (molex output connectors), the speaker or amplifier you furnish. In practice I found that the speaker is all that is needed as the onboard audio amplifier is quite adequate to drive a 3 to 5 inch standard 4-8 ohm speaker. If louder than normal sound is needed then the amplifier system will have to be attached instead of a speaker.

Having experimented with this unit it will be incorporated into our commmunity bulletin board as soon as we get it running. This will allow you to receive vocal instructions as well as digital instructions when you call in. It is far superior to the other systems that we have evaluated. It should find many useful applications being developed for doing everything from listing out source and assembler programs to speaking 'BASIC' as it is running. As you come up with additional uses for this unit, please let me know.

Additional information can be secured from:

Alford and Associates, POB 6743, Richmond, VA - (804) 320-6722.

BIT Bucket

Merrill R. Smith
6139 Pecan Trail
San Antonio, Texas 78249

Dan Williams
'68' Micro Journal
3018 Hamill Road
P. O. Box 849
Hixson, Tennessee 37343

Dear Mr. Williams:

It was certainly pleasing to receive disks one and two offered in your Disk Program Service so quickly. They arrived just four working days following my telephone order. Additionally, your major program choices were excellent, and modifications for my system were minor.

Brian Bailey's FILESORT feature some of the cleanest documentation I've seen. Manipulation of the disk catalogue is a scary process. And the opportunity to see the program documentation to look before leaping is a great help. The anxiety appears to be misplaced. Thusfar FILESORT has produced the results predicted.

Allen Clark's version of DISKEDIT by Lawrence Strickland could be lots of fun just to watch. Clark has done a super job of integrating the CT-82's programmable functions with the DISKEDIT program. The screen presentation for the sector modify mode is an eloquent statement of what real creativity is all about. With a few simple additions, the old file dump display has been transformed into a very sophisticated operator/computer interface. It's both fun and simple to use.

The only modification needed for my system, a S&K SWTPC 6809 with DMAF2 disks and a CT-82 terminal, involved the search mode in DISKEDIT. Search examines the disk contents a sector at a time. The version of FLEX9 I use (2.7?2) returns error ten if an attempt is made to read sectors $20-$3A on track zero. In addition, B-register appears to return with the address of the denied sector. Unfortunately, the program expects it to return with the error code. And since B-register holds the value to be printed in the error display routine, what one sees is not the error code.

The track zero sector read error can be eliminated by making a small change in the modification Clark recommends in DISKEDIT.REP which is included on the program disk. Line #### (between lines 711 and 714 in the original listing) should be changed from LDD #1 to LDD #1101. This change causes the search to begin at track one, sector one. Nothing is lost in the process because that's where the user's files begin anyway.

In addition to modification of the error display routine, I have added some code to bypass EOF errors:

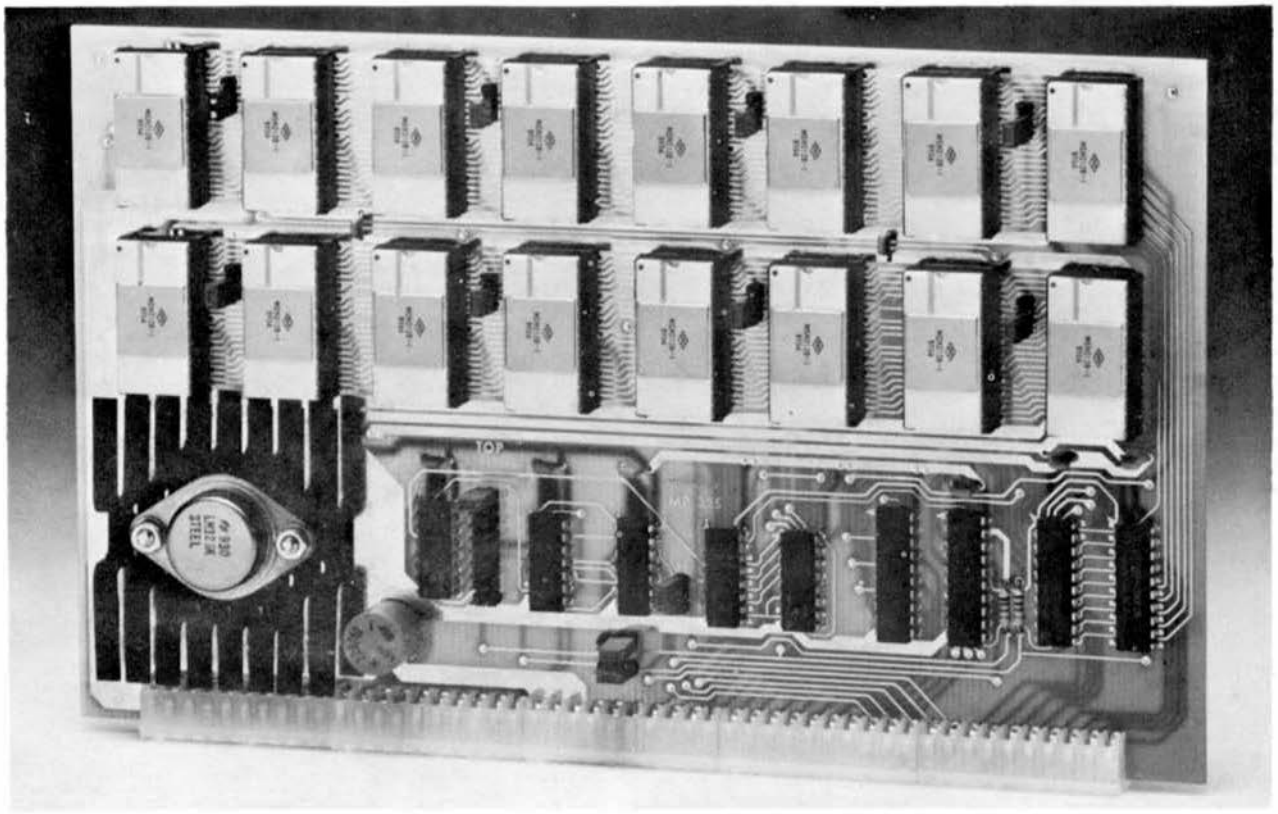
```
184  PSHS B SAVE WHATEVER'S IN B                (PSHS I unnecessary)
 *1  LDD 1,S GET ERROR # FROM FCB
 *2  CMPB #8 IF READ PAST EOF ERROR
 *3  BNE BOERR THEN SKIP ERROR ROUTINE
 *4  PULS B RETRIEVE B
 *5  BRA CNBR AND CONTINUE ON
185 COERR LEAX RDERR,PCR ELSE SOME HARDWARE ERROR     (added label)
186  LBSR PSTRN PRINT MSG HEADER
187  DELETED                                    (moved to 190 *1)
188  LBSR PRTHEX PRINT ERROR # IN HEX
189  LEAX REDERR2,PCR AND TRAILER MSG
190  LBSR PSTRN
 *1  PULS B
```

This is hatchet style re-programming, but it appears to work.

One of the "other" processor oriented magazines appears just to have discovered the 6809. They even go so far as to suggest that it may be a fitting successor to the chip they've been supporting. If they had been reading '68' Micro Journal, they would have known that the 6809 has been eating "apples" for a couple of years. Keep up the good work.

Sincerely,

Merrill R. Smith



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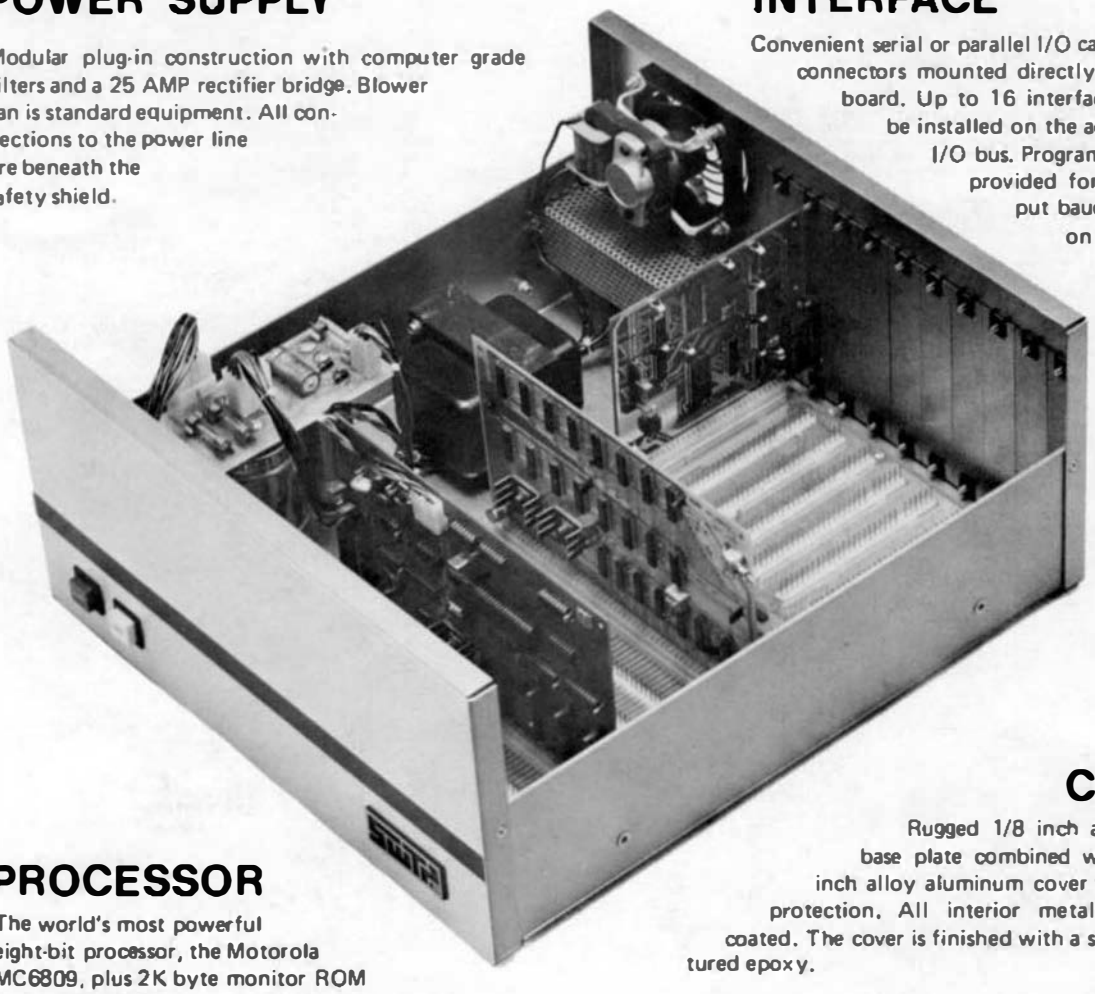
Convenient serial or parallel I/O cards have DB-25 connectors mounted directly on the circuit board. Up to 16 interface devices may be installed on the address decoded I/O bus. Programming strips are provided for input and output baud rate selection on each port. All outputs are fully buffered.



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PERIPHERALS—The wide range of peripheral hardware that is supported by the 6809 includes: dot matrix printers (both 80 and 132 column), IBM Electronic 50 typewriter, daisy wheel printers, 5-inch floppy disk system, 8-inch floppy disk systems and a 16 megabyte hard disk.

SOFTWARE— The amount of software support available for the 6809 is incredible when you consider that it was first introduced in June, 1979. In addition to the FLEX9 operating system, we have a Text Editor, Mnemonic Assembler, Debug, Sort-Merge, BASIC, Extended BASIC, MultiUser BASIC, FORTRAN, PASCAL and PILOT.

69/K Computer Kit with 8K bytes of memory ..... $ 575.00
69/A Assembled Computer with 8K bytes of memory ..... $ 695.00
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SWTPC

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Great Plains Computer Company, Inc.

P.O. Box 916, Idaho Falls, Idaho 83401 Phone (208) 529-3210

68 Micro Journal
Dan Williams, Sr., Editor
PO Box 849
Maxson, Tennessee 37343

Dear Dan and Readers,

In your July, 1981 issue you published a letter from James L. Dean regarding direct cursor positioning on the TARO OUTPOST II computer. I would like to caution your readers using TARO Computers that the method described by Mr. Dean may produce some undesirable side effects. There is a more reliable method of handling direct cursor positioning.

In the TARO Outpost II running 6809 FLEX 2.01(A) and the LOTUS monitor, roughly 90% of the CRT handling is done in software. Poking the CRT registers directly, can have very undesirable side effects. If the user has LOTUS 3, version 1.5 as the monitor, direct cursor positioning is available. Simply use a line such as the following to position the cursor from basic:

150 PRINT CHR$(1);CHR$(X);CHR$(Y)

where X and Y are the cursor coordinates with 0,0 being the home position. If the user has an earlier version of LOTUS which does not have the cursor positioning, an update is available for a modest copying charge.

New Topic:

In an earlier issue, this year, you published a program by Brian Bailey called FILESOR). This is an excellent file directory program with one MAJOR flaw. It is NOT interruptable. Mr. Bailey has made frequent use of the S register for data manipulation. Since any interrupt pushes certain system registers onto the System stack, if the S register is in the wrong place, data will be flabbered.

Our 6809 FLEX file installation on the TARO Outpost II computer is fully interrupt driven. Many other systems are now using interrupts for such things as real time clocks, spooling, etc. I would like to urge readers and users of 6809 systems, PLEASE DO NOT use the system stack pointer (S) for data manipulation. Use the user stack pointer (U) or one of the index registers (X or Y) for this purpose. If you do anything with the system stack pointer, carefully consider..."What would happen if an interrupt occured at this point?"

Keep up the good work with a fine magazine. I will have a separate letter describing experiences and bugs with the Color Computer shortly.

Sincerely,

Carl R. Rasmussen
Manager, Systems Development

APRIL 30,1981
2310 SOUTH 11TH ST.
ALLENTOWN, PA. 18103

DEAR MR. WILLIAMS,

ATTACHED IS A PROGRAM TO REDUCE TELEPHONE EXPENSE AND PROVIDE A HARD COPY WHEN COMMUNICATING WITH BULLETIN BOARDS. OPERATING THE MODEM AT 300 BAND IS A LITTLE FAST TO DIGEST INFORMATION WITHOUT LONG PAUSES, ALSO A HARD COPY IS OFTEN DESIREABLE. I OPERATE THE CRT AT 1200 BAUD AND A TELETYPE AT 110 BAUD. THIS PROGRAM ALLOWS THE THREE SPEEDS BY USING A BUFFER FOR THE 110 BAUD PRINTER. A RAPID EXCHANGE OF MESSAGES OVER THE PHONE COUPLED MODEM REDUCES CONNECTION TIME AND THEREFORE EXPENSE. AFTER THE TRAFFIC EXCHANGE IS COMPLETED AT 300 BAUD THE PHONE IS HUNT UP, BUT THE BUFFER WILL CONTINUE TO EMPTY BEFORE ALLOWING THE PROGRAM TO RETURN TO THE MONITOR.

THE PRINTER IS NORMALLY NOT ACTIVE. A CONTROL 'P' WILL TOGGLE THE PRINTER ON, ALLOWING ALL SUBSEQUENT DATA TO BE ROUTED TO THE CRT AND TO THE PRINTER BUFFER. THE PROGRAM WILL TRY TO EMPTY THE BUFFER TO THE PRINTER WHEN IT IS NOT BUSY SERVICING THE MODEM OR CRT. A SECOND CONTROL 'P' WILL TURN THE PRINTER OFF AND CLEAR THE BUFFER. NO CHECK IS MADE FOR BUFFER OVERFLOW, IF THE PRINTER CATCHES UP TO CURRENT DATA THE BUFFER WILL AUTOMATICALLY RESET TO THE START OF BUFFER.

THE EQUATES ARE REFERENCED FOR THREE OF THE POPULAR OPERATING SYSTEMS TO MAKE IT USEFUL TO OTHER BULLETIN BOARD USERS.

GOOD LUCK AND GOOD WORK ON '68' MICRO JOURNAL

SINCERELY,
NEAL COOK

```
**THIS PROGRAM ALLOWS THE MODEM TO BE**
**CONNECTED TO PORT #3, TTY TO PORT #2,**
**AND TV TERMINAL TO PORT #1. PRINT OUT OF**
**ALL MODEM TRAFFIC TO TV AND PRINTER.**
**THE PRINTER IS TOGGLED BY CONTR L P.**

**            FLEX2 -----FLEX1-----3WTRUG
PORT1   EQU  $9004
PORT2   EQU  $8008
PORT3   EQU  $800C
PUTCHR  EQU  $AD18      $7112       $E1D1
WARMS   EQU  $AD03      $7103       $E0E3
PSTRING EQU  $AD1F      $711A       $E07E

        ORG  $90        TEMPORARY POINTERS
BFRPTR  RMB  2          POINTS NXT AVBL BFR
PNTPTR  RMB  2          POINTS NXT PNTR CHR
PTRFLG  RMB  1

        ORG  $CA00      PROGRAM START ADDR
START   BRA  BEGIN
        FCB  $03        VERSION
BEGIN   JSR  SETBFR     SET UP BUFFER POINTERS
        CLR  PTRFLG     PTR FLAG IS INITIALLY OFF
        JSR  INTIZ3     INITIALIZE MODEM PORT
        JSR  INTIZ2     INITIALIZE PRINTER PORT
MAINLP  JSR  MODMCK     SEE IF MODEM HAS CHAR
        BCS  MODCHAR    IF CHAR AVBLE
        JSR  KBDCK      SEE IF KBD HAS CHAR
        BCS  KBDCHAR    IF KBD HAS CHAR
        JSR  PTRTFC     IS TFC IN BFR FOR PTR
        BCS  PTROUT     IF TFC, TRY OUTPUT IT
        BRA  MAINLP     LOOP-DE-LOOP
INTIZ2  LDX  #PORT2     PRINTER PORT
        LDA A #$03      RESET ACIA
        STA A 0,X
        LDA A #$01      CTL WD- 7 BIT+EVEN PAR
        STA A 0,X               2 STOPS /16CK
        RTS                     (110 BAUD)
INTIZ3  LDX  #PORT3     MODEM PORT
        LDA A #$03      RESET ACIA
        STA A 0,X
        LDA A #$09      CTL  D- 7 BIT+EVEN PAR
        STA A 0,X               1 STOP  /16CK
        RTS
PTRTFC  LDX  PNTPTR
        CPX  BFRPTR     IF EQ NO PRTR TFC
        BNE  TFCAVBL
        JSR  SETBFR
        CLC             CLEAR PTR TFC FLAG
        RTS
TFCAVBL SEC             SET PTR TFC FLAG
        RTS
KBDCK   LDX  #PORT1
        BRA  STATUS
MODMCK  LDX  #PORT3
STATUS  JSR  RECSTAT
        RTS
RECSTAT LDA A 0,X
        ASR A           BIT 00=DATA AVBL=1
        RTS
SNDSTAT LDA A 0,X
        ASR A           BIT 01=ACIA FULL=0
        ASR A
        RTS

SETBFR  LDX  #$0100     INITIAL PTR BFR START
        STX  BFRPTR
        STX  PNTPTR
        RTS
MODCHAR LDA A 1,X       GET CHAR
        AND A #$7F      MASK PARITY
        CMPA  #$7F      IF DELETE FORGET IT
        BEQ  MAINLP
        TST  PTRFLG     TEST PTR FLAG CONDITION
        BEQ  TVONLY     IF PTR OFF DONT PUT IN BUFFER
        LDX  BFRPTR     POINT NXT AVBLE BFR LOC
        STA A 0,X       SAVE IN PTR BFR
        INX
        STX  BFRPTR
TVONLY  JSR  PUTCHR     SEND TO TV
HERE    BRA  MAINLP
KBDCHAR LDA B 1,X
        AND B #$7F      MASK OFF PARITY
        CMP B #$04       IS IT CONTROL D?
        BEQ  SPECIAL    TEMP USED TO END PROG
        CMP B #$10      CONTROL P--PRINT TOGGLE
        BEQ  PTRTOG     THEN TOGGLE PTR FLG
        LDX  #PORT3
WAITMOM JSR  SNDSTAT
        BCC  WAITMOM    MODEM BUSY
        STA B 1,X       SEND KBD CHAR
        BRA  HERE
PTROUT  LDX  #PORT2
        JSR  SNDSTAT
        BCC  HERE       BACK TO MAINLOOP
        JSR  PTRSUB     OR OUTPUT TO PTR
        BRA  HERE
PTRSUB  LDX  PNTPTR     PTR OUTPUT SUBROUTINE
        LDA A 0,X
        INX
        STX  PNTPTR
        LDX  #PORT2
        STA A 1,X
        RTS
SPECIAL JSR  PTRTFC     CK IF PTR BFR EMPTY
        BCC  GOFLEX     IF NO TFC IN PTR BFR
        LDX  #MSG       POINT TO DELAY MSG.
        JSR  PSTRING
WAIPTR  LDX  #PORT2
        JSR  SNDSTAT
        BCC  WAIPTR
        JSR  PTRSUB
        JSR  PTRTFC
        BCC  GOFLEX
        BRA  WAIPTR
PTRTOG  COM  PTRFLG     CHANGE PTRFLG
        TST  PTRFLG     TEST TO SEE IF TURNED OFF
        BNE  HERE       IF NOT GO MAIN LOOP
        BSR  SETBFR     IF NOW OFF CLR BUFFERPTR
        BRA  HERE       THEN MAIN LOOP
```

```
GOFLEX  JMP     WARMS
MSG     FCC     'RETURN TO FLEX DELAYED UNTIL '
        FCC     'THE TELETYPE HAS FINISHED COPYING.'
        FCB     $07,$0D,$07,$0A,$0D,$0A
        FCC     '    HANG UP THE PHONE!!!!!!  '
        FCB     $04
        END     START
```

Don Williams, Publisher
'68 MICRO JOURNAL
Hixson, TN 37343

Dear Don,

I'm honored you decided to print my "TC-3 w/6809" article, and hope some tape users may find it useful. A possible "glitch" has appeared though, which may cause problems for some users of the Kansas-City Loader program.

The problem will most likely appear at the very beginning of the program, after the user has been cued to start the recorder and hit the 'RETURN' key. Instead of proceeding, the program will restart. This occurs because the instruction following the 'character input' instruction (JSR INCH) checks for $0D (CR) in the accumulator (A). If the character input routine called (in S-BUG) doesn't strip the parity bit (bit 7) and your terminal SENDS eight bits, you might end up with $8D in the accumulator instead of the expected $0D, and the program will go no farther.

This happens because there are TWO character input routines in S-BUG: INCH, and INCHE. INCHE, which is entered at $FDBA, ANDs the accumulator with $7F, which effectively 'masks out' bit 7, while INCH ($FDC8) retains all eight bits, if received. It makes no difference which routine you use if your keyboard/terminal only SENDS seven bits, but if it sends a parity bit (bit 7), this must be masked off before CMP-aring the A accumulator with $0D. My terminal is hardware-set (by option switch) to send seven bits, so I never really paid much attention to which S-BUG routine I used, except when I specifically wanted the input character to be 'echoed' back on the CRT. INCHE also does this, whereas INCH doesn't. So, if your keyboard/terminal sends eight bits, preventing the program from starting the load, either add a ANDA #7F right after the JSR INCH instruction, or change INCH's EQUate from $FDC8 to $FDBA.

Hope this prevents any problems encountered by some users.

Sincerely,

Keith Alexander

WESTCHESTER Applied Business Systems
P.O. Box 187
Briarcliff Manor, N.Y. 10510
(914)-941-3552

June 25, 1981

SOFTWARE REPRICE NOTICE

Effective July 1, 1981, Westchester Applied Business Systems software prices on Database Management Systems will be drastically restructured.

This action is being taken in order to expand our customer base, to increase revenue, and to provide the capital necessary to pursue the development of advanced multi-user and multi-system software. These new systems will be offered at highly competitive prices.

The following are effected by the repricing:

The DMS2/VM Data Management System is reduced from $650. to $100. Maintenance will consist of periodic notices of enhancements which the purchaser may elect to receive via disk for a service charge.

The DMS1 Data Management System is reduced from $250. to $50. This package is oriented toward hobbyists and students wishing to learn more about data management and toward those who have minimum (32K) data file storage requirements. Enhancements applied to DMS2/VM will also be applied to DMS1.

The ACC1 Basic Accounting System is being withdrawn from the market. This system has not received widespread popularity and its removal will reduce our maintenance costs.

The ACC2 Basic Accounting System, which runs under DMS2/VM, will continue to be offered at $350.

The User Guide is included with each system purchased. We will no longer supply a 3-ring binder, which may be purchased locally. License forms are no longer necessary, however, a non-proliferation agreement is implied with the sale of software.

The User Guides remain available as a separate purchase for those who wish to evaluate the systems prior to purchase. The cost is deductible from the software purchase price.

Thomas E. Leire
President

HAZELWOOD COMPUTER SYSTEMS
7413 N. Lindbergh Blvd.
Hazelwood, MO 63042

6809/68000 COMPUTER SYSTEM

Hazelwood, Missouri --- Hazelwood Com ter Systems announces their HELIX computer system. Based on an expanded version of the SS-50 bus, the HELIX can utilize either a 6809 or a 68000 processor. The expanded bus, termed the SS-64 bus, accomodates the 68000 processor with no loss of capability in either addressing or data transfer rate. Bus expansion is accomplished by adding four address lines, eight data lines, and two word control lines to the existing 50 pin bus. Proper use of the word control lines allowes 16 bit and 8 bit devices to operate intermixed on the bus. Relying on the physical nature of the connectors used by the SS-50 bus, bus compatibility is achieved simply by allowing the 14 expanded bus lines to remain unconnected when 50 pin boards are inserted. Keying of the boards ensures unambiguous insertion of a 50 pin board into the physically wider 64 pin bus. The wider bus also permits a 25% larger board which is advantageous with the 64 pin package used by the 68000. The standard 30 pin I/O bus is not affected by the main bus expansion.

The HELIX system bus is housed in an attractive integral cabinet which can accomodate 10 SS-64 boards on the main bus and 14 boards on the 30 pin I/O bus. In addition, the equivalent of two I/O boards are mounted directly on the system bus board, providing two RS-232 serial ports and two parallel ports. One parallel port is buffered for printer output and the other may be used for input or unbuffered output. Provision is made for mounting two 5 1/4 inch disk drives, either floppy or Winchester, directly in the cabinet. The HELIX is ered by a ferro-resonant er supply, conservatively rated at a TRUE 25 Amps at 8.5 Volts. AC power is controlled by a front panel mounted key switch. While primarily designed for table top use, rack mount adaptors are available which allow easy integration into instrument rack assemblies and office desk cabinets.

The 6809 HELIX is the first 6809 system designed from the ground up to operate at 2MHZ. "B" specification parts are employed throughout in order to ensure reliable performance at the faster clock rates. The 6809 processor board, (CP-09) has provision for six 2716 PROMS which may be selectively ma ped into ROM address space for self-test and bootstrap operations. The board comes standard with a 1K scratchpad RAM, 6840 timer, and a Dynamic Adress Translator (DAT) which is compatible with both GIMIX and SWTPC DATs thereby ensuring software compatibility. The processor board is equipped with a console connector and supporting logic which, when used with an optional console panel, greatly enhances the software development support capability of the system. The HELIX normally utilizes one or more of Hazelwood's field proven DM-64 2MHZ 64K dynamic memory board. This memory, employing a proprietary memory control design, allows full 2MHZ operation with no lost or stolen cycles. The system is available with a 5 inch double density flop y disk controller and can accomodate other disk controllers if 8 inch and/or DMA is required. Software compatibility includes OS-9 and FLEX.

The 68000 HELIX allows full use of 68000 ca abilities. The 24 bit address space addresses up to 16 Megabytes of memory and when used with the new DM-512 memory, 16 bit transfers are possible at full clock rates. The 10 main bus p sitions allow a maximum of 4 Megabytes of memory in the cabinet, along with a 16 bit wide DMA disk controller. The 68000 processor board (CP-68K) includes onb ard ROMs for self-test and bootstrap operations, a Memory Management Unit (MMU) which supports UNIX-like operating systems, a console co nector which supports an option software development console pane , and byte/word logic which allows the 68000 to utilize existing 8 bit memories such as the DM-64.

Representative prices for HELIX systems, less disk subsystem, are:

6809 HELIX, 64K	$1995
68000 HELIX, 64K	$2595
68000 HELIX, 512K	$4995

HELIX is a trademark of Hazelwood Computer Systems
OS-9 is a trademark of Microware Systems Corporation
FLEX is a trademark of Technical Systems Consultants, Inc.
UNIX is a trademark of Bell Telephone Laboratories, Inc.

SS-64 BUS SPECIFICATION

The SS-64 Bus is an extention of the SS-50c Bus which is capable of sixteen bit parallel data transfers as well as full twenty four bit memory addressing.

Throughout this specification, a Bus Master is considered to be any board capable of controlling the Bus (CPU, DMA boards) while the term Slave refers to those boards which respond to the requests of the Bus Masters (memories, programmed I/O boards).

The SS-64 accomodates the new 16-bit processors in two basic modes. These are: 1) full 16-bit parallel data transfers
2) multiplexed 16-bit data transfers in two 8-bit bytes

Full 16-bit transfers are possible with 16-bit memory boards while 8-bit transfers are used with existing 8-bit memory boards. The two handshake signals (WORDREQ and WORDACK) allow 8 a d 16-bit memory boards to be used in any mix requiring no special switch or jumper settings on any of the boards. Also, 16-bit memory boards may be used with 8-bit CPU boards on the SS-64 bus, again with no special switch settings.

All existing SS-50 boards may be used on the SS-64 bus and where physical space permits, all SS-64 (16-bit) boards may be used on the SS-50 bus.

The SS-50 I/O bus (SS-30) is retained exactly as is for complete compatibility.

The operation of the handshake lines is as follows. Concurrent with the setting up of the address and read/write lines, the 16-bit CPU sets the WORDREQ line to a low (assuming a 16-bit transfer is requested). If a 16-bit memory board is selected by the address lines, it sets WORDACK to a low for the duration of the cycle. If an 8-bit memory is selected by the address lines, it will not be connected to the WORDREQ and WORDACK lines, and will thus not respond to the WORDREQ with a WORDACK. The 16-bit CPU not having received a WORDACK will respond by finishing the current cycle and then initiating another cycle at the next address to pick up the remaing 8 bits. It then presents the two bytes to the CPU chip as a 16-bit word.

PIN	MNEMONIC	DESCRIPTION	SOURCE	DESTINATION
1	WORDACK	16-bit word acknowledge	slave	master
2	WORDREQ	16-bit word request	master	slave
3	D8	data bit 8	any	any
4	D9	data bit 9	any	any
5	D10	data bit 10	any	any
6	D11	data bit 11	any	any
7	D12	data bit 12	any	any
8	D13	data bit 13	any	any
9	D14	data bit 14	any	any
10	D15	data bit 15	any	any
11	D0	data bit 0	any	any
12	D1	data bit 1	any	any
13	D2	data bit 2	any	any
14	D3	data bit 3	any	any
15	D4	data bit 4	any	any
16	D5	data bit 5	any	any
17	D6	data bit 6	any	any
18	D7	data bit 7	any	any
19	A15	address bit 15	master	slave
20	A14	address bit 14	master	slave
21	A13	address bit 13	master	slave
22	A12	address bit 12	master	slave
23	A11	address bit 11	master	slave
24	A10	address bit 10	master	slave
25	A9	address bit 9	master	slave
26	A8	address bit 8	master	slave
27	A7	address bit 7	master	slave
28	A6	address bit 6	master	slave
29	A5	address bit 5	master	slave
30	A4	address bit 4	master	slave
31	A3	address bit 3	master	slave
32	A2	address bit 2	master	slave
33	A1	address bit 1	master	slave
34	A0	address bit 0	master	slave
35	GND	ground		
36	GND	ground		
37	GND	ground		
38	+8V	positive 8 Volts	PWR	
39	+8V	positive 8 Volts	PWR	
40	+8V	positive 8 Volts	PWR	
41	-16V	negative 16 Volts	PWR	
42	+16V	positive 16 Volts	PWR	
43	INDEX	board insertion index		
44	MRDY	memory ready	slave	master
45	BUSY	processor busy	CPU	any
46	IRQ	interrupt request	any	CPU
47	FIRQ	fast interrupt request	any	CPU
48	Q	quadrature clock	CPU	any
49	E	enable (main clock)	CPU	any
50	VMA	valid memory address	master	slave
51	R/W	read/write control	master	slave
52	RESET	system reset	CPU	any
53	BA	bus available	CPU	DMA
54	BS	bus status	CPU	DMA
55	HALT	processor halt request	DMA	CPU
56	BUSREQ	bus request	DMA	CPU
57	A19	address bit 19	master	slave
58	A18	address bit 18	master	slave
59	A17	address bit 17	master	slave
60	A16	address bit 16	master	slave
61	A23	address bit 23	master	slave
62	A22	address bit 22	master	slave
63	A21	address bit 21	master	slave
64	A20	address bit 20	master	slave

Mr. A. P. M. de Kok
advocaat en procureur
[illegible]

BREDA 6 juli 1981.

[illegible]

' 68 '
Micro Journal
POB 849
3018 Hemill Road
Hixson Tennessee 37343
U S A

Dear Sire,

Please continue,until further notice !!!!

I think your journal is a must and a very good one too !
The style is light and I appreciate your sense of humour,but on the other hand the information is extremely usefull.
I like to read the advertisements (in bed) over and over again and I relish them,and then after carefull study,I order.
I specially subscribed to mastercharge in order to pay what I ordered from your magazine in a smooth relaxed way ! How is that !
I enclose a ham telex program,that really worked, when I still had the 6800.
I still have to update it to 6809,I made it all by myself,and I hope it is sufficiently self explanatory to publish it.

For payment of my subscription,I refer tot the mastercharge label to the amount of $ 30,50 plus costs for one year non USA surface mail (slow but cheaper).
Please continue after the year until further notice.

yours truly,

A.P.M.de Kok.

```
* TELEX PROGRAM FOR SWTPC 6800

* MADE BY AFM DE KOK, PAOTFM
* BREDA HOLLAND 25 OCTOBER 1980

* VERSION 12

8004    CTR     EQU     $8004
8005    DATA    EQU     $8005
8010    PORT    EQU     $8010       PIA IN SLOT 4
8011    PORT2   EQU     $8011
E0CA    IEX     EQU     $E0CA
AD24    LF      EQU     $AD24       LINE FEED FROM FLEX
AD0F    ASC     EQU     $AD0F       ASCII FROM FLEX
0100            ORG     $0100

* PROGRAM WORKS IN COMBINATION WITH UART
* SEE ARTICLE IN RTTY JOURNAL APRIL AND MAY 1974

* TO RESTART PROGRAM HIT THE ESCAPE
* TO GET BACK TO FLEX GIVE CAR RETURN

0100 BD AD 24   START   JSR     LF          LINE FEED
0103 BD AD 24           JSR     LF
0106 C6 01              LDA B   #$01        FLAG FOR LETTERS
0108 86 00              LDA A   #$00        INIT PIA
010A B7 80 10           STA A   PORT
010D 86 3E              LDA A   #$3E
010F B7 80 11           STA A   PORT2
0112 86 00      CTR1    LDA A   #$00        INPUT CHR
0114 97 02              STA A   $02
0116 B6 80 10   CTR2    LDA A   PORT
0119 43                 COM A
011A 84 80              AND A   #$80        WAIT FOR CHR READY SIGNAL
011C 81 80              CMP A   #$80        READY BIT 8
011E 27 F2              BEQ     CTR1
0120 B6 80 04   LBL1    LDA A   CTR
0123 81 03              CMP A   #$03
0125 27 4D              BEQ     LBL12
0127 B6 80 10   LBL1B1B LDA A   PORT        WAIT TILL CHR IS IN
012A 97 01              STA A   $01         $01 STORAGE CHR
012C 43                 COM A
012D B4 80              AND A   #$80        WATCH BIT 8
012F 81 80              CMP A   #$80        IS IT '1' ?
0131 26 E8              BNE     LBL1
0133 B6 80 10   LBL2    LDA A   PORT        ISOLATE 5 BITS
0136 84 80              AND A   #$80        WATCH BIT 8
0138 81 00              CMP A   #$00        IS IT '0' ?
013A 26 F7              BNE     LBL2
013C 96 02              LDA A   $02         GET RID OF ECHO
013E 81 00              CMP A   #$00
0140 26 D0              BNE     CTR1
0142 96 01              LDA A   $01
0144 84 1F              AND A   #$1F        GET FIRST 5 BITS
0146 97 01              STA A   $01         STORE INPUT CHR
0148 81 02              CMP A   #$02        IS IT A LINE FEED ?
014A 27 D4              BEQ     LBL1
014C 81 08              CMP A   #$08        IS IT A CAR RETURN ?
014E 27 53              BEQ     LBL9        THEN ADD LF
0150 81 1B              CMP A   #$1B        CHECK FOR FIGURES
0152 27 41              BEQ     LBL6
0154 81 1F              CMP A   #$1F        CHECK FOR LETTERS
0156 27 46              BEQ     LBL7
0158 5D                 TST B
0159 2F 29              BLE     LBL5
015B CE 02 00   LBL8    LDX     #$0200      BEGIN TRANSFORMATION
015E D6 00              LDA A   #$00        FIRST OFFSET=0
0160 97 05              STA A   $05
0162 A6 00      LBL3    LDA A   0,X
0164 91 01              CMP A   $01
0166 27 0F              BEQ     LBL4        FOUND CHARACTER
0168 08                 INX                 NEXT CHECK
0169 7C 00 05           INC     $0005
016C 96 05              LDA A   $ 5
016E 81 5F              CMP A   #$5F        MAXIMUM DATA
0170 22 AE              BHI     LBL1
0172 20 EE              BRA     LBL3
0174 7E 01 BD   LBL12   JMP     LBL13
0177 96 05      LBL4    LDA A   $05         ASCII VALUE IN $05
0179 97 03              STA A   $03
017B BD AD 0F           JSR     ASC         PRINT FOUND CHARACTER
017E 86 01      LBL10   LDA A   #$01
0180 97 02              STA A   $02         SET FLAG AGAINST ECHOS
0182 20 9C              BRA     LBL1
0184 86 20      LBL5    LDA A   #$20        FORM SIGN INTO FIGURES
0186 9B 01              ADD A   $01
0188 97 01              STA A   $01
018A 96 04              LDA A   $04
018C 4C                 INC A
018D 81 0A              CMP A   #$0A        MAX NUMBER OF FIGURES=10
018F 22 23              BHI     LBL11
0191 97 04              STA A   $04
0193 20 C6              BRA     LBL8
0195 C6 FF      LBL6    LDA B   #$FF        SET FLAG FOR FIGURES
0197 86 00              LDA A   #$00
0199 97 04              STA A   $04
019B 7E 01 12           JMP     CTR1
019E C6 01      LBL7    LDA B   #$01        SET FLAG FOR LETTERS
01A0 7E 01 12           JMP     CTR1
```

```
01A3 B6 0A      LBL9    LDA A   #$0A        GIVE LINE FEED
01A5 BD AD 0F           JSR     ASC
01A8 B6 0D              LDA A   #$0D
01AA BD AD 0F           JSR     ASC
01AD 86 01              LDA A   #$01
01AF 97 02              STA A   $02
01B1 7E 01 16           JMP     CTR2
01B4 86 00      LBL11   LDA A   #$00        COUNTER FOR FIGURES ZERO
01B6 97 04              STA A   $04
01B8 C6 01              LDA B   #$01        SET FLAG FOR LETTERS
01BA BD 01 12           JSR     CTR1
01 D B6 00 05   LBL13   LDA A   DATA
01C0 81 0D              CMP A   #$0D        CAR RETURN TO STOP PROGRAM
01C2 27 07              BEQ     LBL12B1S
01C4 81 9B              CMP A   #$9B        ESC FOR RESTART
01C6 27 06              BEQ     LBL14
01C8 7E 01 27           JMP     LBL1B1S
01CB 7E AD 03   LBL12B1S JMP                $AD03
01CE 7E 01 00   LBL14   JMP     START

* NOT USED MEM LOCATIONS BETWEEN 0200 & 0260:$00

0200 00
020A 02
020D 08
0220 04
0222 31
0223 34
0224 29
0226 3A
022C 2C
0227 2B
0228 2F
0229 32
022D 23
022E 3C
022F 3D
0230 36
0231 37
0232 33
0233 21
0234 2A
0235 30
0236 35
0237 27
0238 26
0239 38
023A 2E
023B 3E
023C 00
023D 00
023E 00
023F 39
024D 00
0241 03
0242 19
0243 0E

0244 09
0245 01
0246 0D
0247 1A
0248 14
0249 06
024A 0B
024B 0F
024C 12
024D 1C
024E 0C
024F 18
0250 16
0251 17
0252 0A
0253 05
0254 10
0255 07
0256 1E
0257 13
0258 1D
0259 15
025A 11
025B 2F
025C 00
0250 32
025E 00
025F 00

                                    END     START

NO ERROR(S) DETECTED
```

CLASSIFIED ADVERTISING

TANO 56K Dual Serial Ports, Dual 5" Disk Drives, Like New, Wholesale $5300 Will Take $3750. 1 CT-82 CRT terminal (new in box - never used) $845. 1 CT-82 CRT terminal (Used) works fine $745. Decision Data High Speed Dot Matrix 132 Column Tractor Fed Printer (LIKE NEW Quality & Condition) (New cost $2495.00) SAVE $1,000.00 - ONLY $1495.. Leedex Video 100 Monitor (Brand New) $75. SWTPC 5" Double Head Double Density Dual Drive Disk System with DC-3 Controller Board $950 or with DC-4 Controller Board $1050. LEW 8am-5pm 1-615-877-2241

***

SWTPC 6809 w/48K dynamic, MP-8 motherboard completely decoded $900. Smoke Signal BFD-68 disk system w/ two drives, controller and DOS 68, V5.1. $650. PTA controller, empty, $50. Populated, $80. AC-30 cassette, $45. MP-N calculator board, $45. MP-C serial port, $35. 4K memory boards $45 each. Make offer on any or all of above. Dale L Puckett, 14753 Endsley Turn, Woodbridge, Va 22193. Phone Day 1-202-472-9435, Night 1-703-670-6542.

***

SS-50 Modem Board, VC 256 Graphics Board, Dual Mini-Floppy Disk Drives and P/S. Cheap, Call John 1-216-747-6781.

***

SWTPC 20K 6800, MP-C, MP-S, MP-LA, AC-30, Recorders, CT-1024, Monitor, PR -40, and usual SWTPC software, $850. M.R. SMITH, 6139 Pecan Trail, San Antonio Tx 78249, 1-512-696-0945.

***

HELP

HAS ANYONE ELSE IN THE U.K. BEEN FARSIGHTED(!?) ENOUGH TO PURCHASE A 6809 PROCESSOR ON AN S100 CARD?.I HAVE NOW GOT BOTH THE MICRO-DA-SYS 6906 AND THE ACKERMAN DIGITAL SYSTEMS 6809 CPU CARD. THE REST OF THE SYSTEM CONSISTS OF 16K STATIC RAM, VB3 VIDEO CARD AND A DELTA S100 MAINFRAME. THE TERMINAL I USE IS A HOME-BREW.I HAVE HAD A CONSIDERABLE AMOUNT OF TROUBLE WITH THE CASSETTE INTERFACE ON BOTH OF THE ABOVE BOARDS AND I WOULD BE GRATEFUL FOR ANY ADVICE FROM FELLOW USERS. IT WOULD BE OF INESTIMABLE VALUE IF A NUMBER OF US COULD GET TOGETHER TO DEAL WITH THE U.S. SUPPLIERS.

A. SMITH-CRALLAN
WARRAGLOBE LTD,ELECTRONIC ENGINEERS
20 BOWYER CRESCENT, WORKINGHAM, RG11 1TF
ENGLAND

Dear Sir,

Could you please tell me how to create voice systhesis on the color computer as used in the R.S. program pac SKIING. I was told it was possible with machine language and I would appreciate your HELP or that of your readers. I know it would be would be greatly appreciated by many to know how to do it.

Peter Kovach
RR 7
Hayward, WI 54843

Amateur Station W6KMI
Julian "Jerry" Faas
4713 East Tyler Avenue
Fresno, Ca 93702

To Mr. Don Williams of 68' Micro Journal

Thanks a Million for locating Thomas Williams at Data-Comp Div. He checked the DC-1 board and returned it and my 6800 is working great.
Thanks again, sure appreciate the trouble you went through to do this for me.

73 Jerry

Dear Don,

Here is my 2 year subscription, and why, because of the journals ARTICLES and ADVERTISING for the TRS80C. I purchased CBUG based on your review and was greatly satisfied with the product. I say this in hopes of your expanding TRS80C Articles, Please!
Don, could you or any of your readers give me any information on putting 8K of RAM (w/details) on the $C000 boundary address for the TRS80C?
Continue the Good Work.

Thank You,
Dennis Wojtaslak
1320 E North St
Waukesha, WI 53186

GIMIX INC. 1337 WEST 37TH PLACE • CHICAGO, ILLINOIS 60609 • (312)927-5510 • TWX 910-221-4055

PRESS RELEASE

SOFTWARE SELECTION BETWEEN OS-9™ AND GMXBUG-09™/FLEX™ ON GIMIX™ CPU BOARDS

Software selection between monitor/operating systems is now available for use with our 256 single density programmed I/O and 260 double density DMA disk controllers. It will not be available for the 128 double density programmed I/O controller which does not have the necessary software control of its interrupt outputs.

A specially programmed PPLA for the GIMIX™ 6809 CPU board and two utility programs, one for each operating system, allow the user to switch between GMXBUG-09™ and OS-9™ PROMS, installed on the CPU board, under software control.

The PPLA also permits hardware selection between the two sets of PROMs by resetting only a DIP-switch on the CPU board and, in certain configurations, enabling or disabling interrupts from the CPU board and disk controller. This configuration will work with any GIMIX™ disk controller, including the 128 double density programmed I/O controller.

The software select feature is included with all systems that are ordered with both GMXBUG-09™/FLEX™ and OS-9™. For information on adding the software select feature to existing systems please contact the factory.

Please note: The software selection PPLA does not have some of the special configurations that are available on the standard PPLA. If you are using a configuration other than the normal GMXBUG-09™/FLEX™ configuration on the standard PPLA, please contact the factory for more information before ordering the software select option.

TIMINGS OF BASIC FOR COLOR COMPUTER

The Basic Program as given in the February, 1981, Micro Journal, p. 14, took 6 hrs. 28 min. 30 sec. on my Color Computer.

At first glance this seems slow but we should go deeper.

The Color Computer runs at .895 MHz and carries 9 digits in floating-point. The program will take longer to run than with a Basic with less digits and/or integer Basic, and/or a faster cycle time.

The program as given penalizes Basic. Changing line 100 to:

100 D = M/K : IF INT (D) = D THEN 190

will improve performance from 9 to 10%.

Further changing as follows will improve performance another 2 to 3%.

Take out line 70.

80 FOR M = 5 TO 10000 STEP 2.

190 NEXT M.

These changes would not change the assembly listings.

Much more testing on other programs needs to be done to determine the performance of the Basic for the Color Computer.

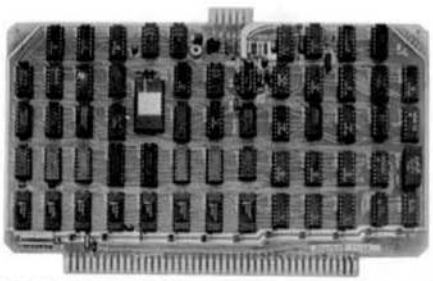
There is nothing wrong per se in using an inefficient algorithm for timing comparison, but there is danger that the program might be used as a Prime Number Generator. While the program given is not as inefficient as some (for example the one listed in the book Some Common Basic Programs), it is very inefficient.

By adding a few lines to the program in Basic I have been able to list the prime numbers to 10000 in 16 min. 40 sec.

The assembly program should be correspondingly faster.

February 7, 1981
Charles C. Worstell PHD
36012 Military Road S.
Auburn, WA. 98002
Ph. (206) 927-6038

M6800 & M6809



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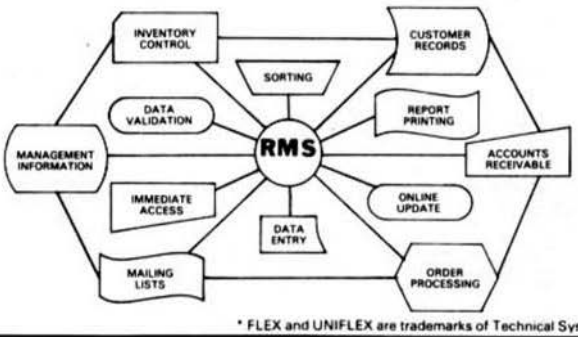

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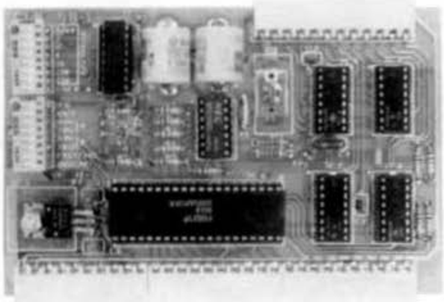

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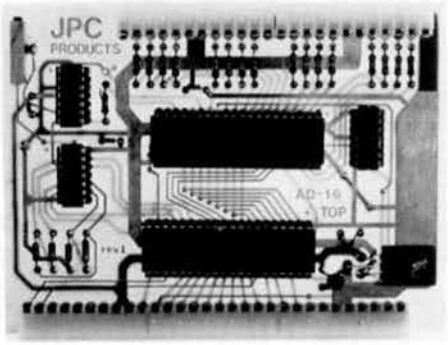

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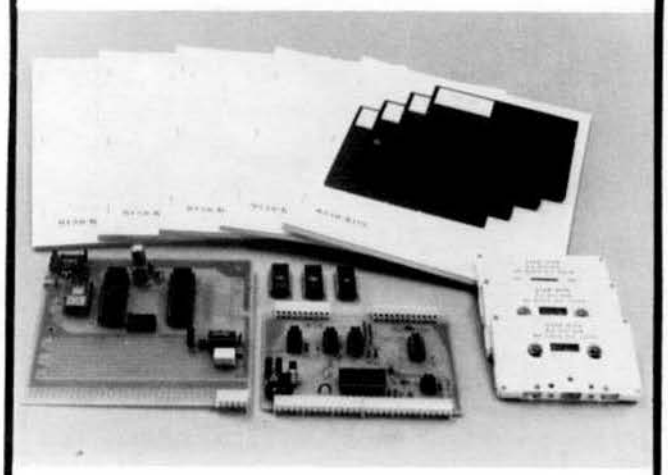

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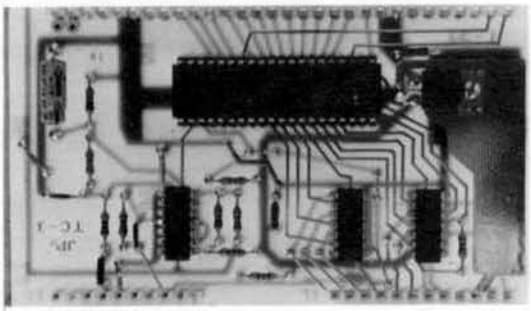

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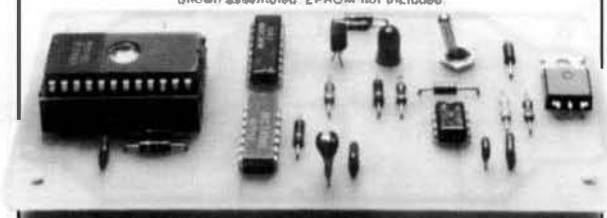

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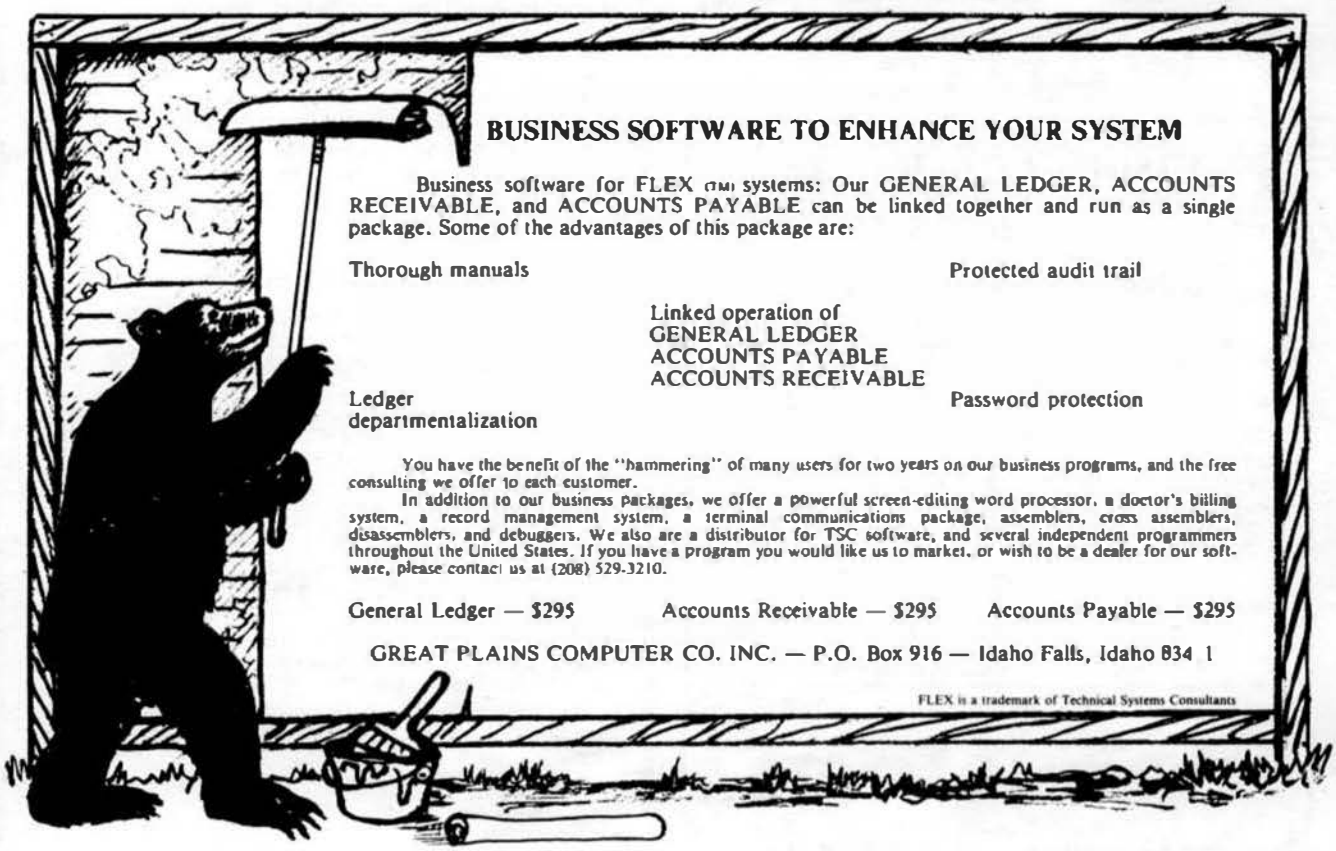

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The VS-1 "SPEAKER" voice synthesizer is an interface board for the SS-50 bus which provides unlimited human speech capability at a modest price. The VS-1 is intended for the industrial and commercial application where specialized vocabularies and ease of programming make "canned-message" synthesizers unsuitable. By using phoneme coding, high quality speech, tailored to meet any application, is possible.

FEATURES—

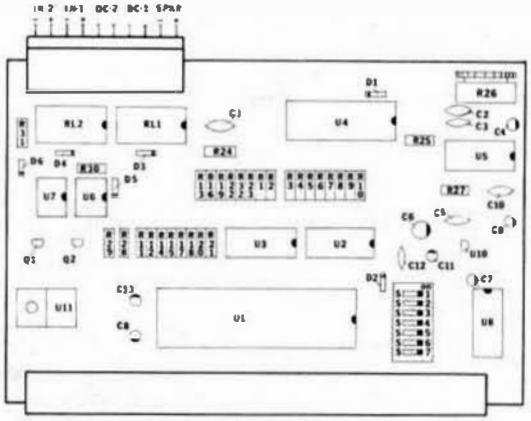
- phoneme coding allows unlimited speech
- low data rate doesn't hog CPU time
- efficient - very little memory needed for messages
- programmable inflection and pitch
- on-board amplifier drives 4- or 8-ohm speaker directly
- assembled, tested, burned in
- meets Class A device radiation limits under FCC Part 15
- dip-switch decode select for 4- or 16-address I/O
- dip-switch programmable NMI and IRQ interrupts

SPECIFICATIONS—

PHONEME CODES	- 61 plus 2 pause, 1 stop
INFLECTION LEVELS	- 4 major, 16 minor - 64 total
VOICE PITCH	- male baritone, variable base to tenor
DATA RATE	- 4 to 20 BPS, depending upon phoneme
MESSAGE MEMORY	- approx. one byte-per-letter in English
AUDIO OUTPUT	- .2 watt average, 2 watt peak into 8-ohms
RESIDUAL NOISE	- -45 dBm typical
SIZE	- 3 1/2" by 5 1/4" (standard I/O size)
LOCATION	- one 30-pin I/O slot
ADDRESSING	- four addresses in I/O space
POWER REQUIREMENT	- +8 vdc @ 100 ma., +14 vdc @ 150 ma. max.
SPEAKER CONNECTOR	- 10-pin molex, mating half supplied

SOFTWARE—

- VOX-EDITOR mnemonically edits message (source included)
- example programs in assembly and Basic
- speech files
- shipped on 5- or 8-inch disk for single-user TSC or SSB DOS
- 6800 or 6809 code



VS-1 SPEAKER, manual, program disk....$229.95

MASTERCARD, VISA, UPS COD's, checks accepted. All payments MUST be drawn on funds in U.S. banks. Virginia residents add 4% state sales tax. Shipping pre-paid on continental orders. On overseas orders, add $15 for shipping. Open accounts by previous written arrangement only. Shipping from stock to 30 days. Office hours are from 8:30 to 5:30 EST (EDT), Monday through Friday.

ALFORD & ASSOCIATES
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SMOOTH™ Software

Modem Program with Disk File Transfer (Instructions and Source Listing) $30.00
Super Modem Program (Manual with Instructions and Source Listing) 50.00
Disk with source and object code
Specify Regular or Super, 6800 or 6809, SSB or FLEX™, 5" or 8" add 10.00

ALL IN ONE for only $45.00
Editor - Text Processor - Mailing Labels
Mailing Lists - Use any CRT terminal and printer

Supports editing commands such as bottom, change, delete, find, insert (single line), input (multiple lines), list, next, overlay (with cursor editing, character deletion and insertion), overstrike (for selected darker text), print, restart, set, top, underline, up, and verify.

Supports Text Processing commands such as block copy, block move, centering, margin justification (wide and narrow), paging, and tabbing.

Mailing Lists and Labels. Use the same mailing list disk file (with protected areas) for both mailing labels and repeat letters. Repeat letters are personally adressed to each person or selected persons on the mailing list.

Most Powerful File Handler found in any editor. Append one file to the end of another, or insert (merge) one file into another as designated by the line pointer. Print specified lines to your printer or to a disk file. Edit files larger than the text buffer. Does not produce output files when not desired. Delete disk files from the editor.

Printer commands. Control characters can be sent to the printer for format control either directly from the control terminal or by embedding them in the text. The set command contains interface initialization and character output routines to support the SWTPC MP-C interface as well as the standard serial and parallel interfaces. Jumpsere also provided (user supplied print routines. User selectable port address (0 thru 7, A or B) thereby eliminating the need for the user to install printer software routines. Editor can be initialized for either 4 or 16 addresses per port.

Editor allows exiting to either the monitor or DOS and then reenter (WarmStart) without destroying previously prepared text in the buffer. The Restart commend erases contents in the buffer without the user having to reload the Editor.

The Editor allows the user to toggle between full duplex (no echo) and half duplex (echo) as needed. It responds to commands in both upper and lower case and can be used to create assembler source code and Basic programs as well as text.

Specify 6800 or 6809, SSB or FLEX™, 5" or 8" 45.00
Printed source listing is available for an additional 35.00

Software by Technical Systems Consultants, Inc.

Flex™ (includes Editor and Assembler)	150.00
UniFLEX™ (includes one year maintenance and updates)	450.00
Editor	50.00
Assembler	50.00
6809 Cross Assembler on 6800	100.00
68000 Cross Assembler on 6800 or 6809	250.00
Text Processor	75.00
Basic	75.00
Extended Basic	100.00
Basic Precompiler (specify standard or extended)	50.00
Multi-User Basic for S/09	150.00
Pascal (Flex™)	200.00
Pascal (UniFLEX™)***	225.00
***One year maintenance and update	add 75.00
6800 Flex™ Utilities	100.00
6809 Flex™ Utilities	75.00
Debug Package	75.00
Diagnostic Package	75.00
*The following are available for 6800 only	
Soap (stack oriented arithmetic processor)	25.00
Floating Point Package	25.00
Scientific Functions Package	25.00

Software by Microware Systems Corp.

OS-9™ Level One Operating System**	195.00
OS-9™ Level Two operating System	495.00
BASIC09***	195.00
**yearly Maintenance and Update	add $75.00
OS-9™ Text Editor	95.00
OS-9™ Interactive Assembler	95.00
OS-9™ Interactive Debugger (Disk version)	36.00
RT/68 Real Time Operating System (6800 or 2708)	75.00
Specify manufacturer and type of CPU and I/O controller	
ABASIC on cassette (Limited quantity)	Phone for special price

SWTPC	Kit	Assembled
All Bareboards (sorry)	N/A	N/A
8209 9" Intelligent Terminal	N/A	945.00
8212 12" Intelligent Terminal	N/A	995.00
8212W 8212 with word processing enhancements	N/A	1095.00
DC-1 or DC-2 5" Disk controller (limited quantity)	N/A	125.00
CT-64 Terminal kit (limited quantity)	325.00	450.00
DMF-2 8" DMA double density, double sided controller board	N/A	495.00
MP-A CPU Board	N/A	95.00
MP-A2 CPU Board	N/A	150.00
MUB-68 Multi-User Board with Multi-User Basic	N/A	150.00
68/1 Computer	315.00	315.00
4K RAM Board	70.00	65.00
MP-S Serial Interface (single port)	40.00	60.00
MP-S2 Serial interface (dual port)	N/A	120.00
MP-LA Parallel interface (dual port)	40.00	60.00
MP-L2 Parallel interface (dual port)	N/A	120.00
MP-R Single voltage 2716 prom programmer	N/A	99.50
MP-N Calculator board	54.95	80.00
MP-T Interrupt Timer	47.50	80.00
MP-8M 8K 4044 Memory board (limited quantity of kits)	160.00	235.00
532 Universal Static Memory Board	N/A	99.50
S3216 Universal Static Memory Board with 16K Ram	N/A	295.00
S3232 Universal Static Memory Board with 32K Ram	N/A	495.00
MP-09 6809 CPU board kit (assembled board has sockets)	175.00	225.00
68 Chassis, P.S., 2MHz 6809 CPU, 8K, RAM, One Serial Port	575.00	695.00
S/00 Chassis, Power Supply I/O (no processor or memory)	N/A	595.00

6800 CPU and Disk Controller Boards
Due to the relative unavailability of these SWTPC items please refer to the next column for ELEKTRA and GIMIX alternatives. Phone for SWTPC availability.

Universal 68XX Motherboard. SS-50/50C, 4/16 addresses per port 60.00

Connectors (10 pin, Titanium-Tin plated 5 microns for near gold quality)
Male with square cross section pins each .50
Female each .75

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FLEX and **UniFLEX** are trademarks of Technical Systems Consultants, Inc.
OS-9 and **BASIC09** are trademarks of Microware Systems Corp.
GIMIX® and **GHOST®** are registered trademarks of GIMIX Inc.

ELEKTRA™ SSS0 Computer Products

DPSb Dual Port Serial Interface bare board and documentation	20.00
DPPb Dual Port Parallel Interface bare board and documentation	20.00
MBb Motherboard bareboard and documentation	N/A
CPU-8/9b 6808-6809 CPU bare board and documentation (6808 is 6800 software compatible)	50.00
HUMBUG (from STAR-KITS) for CPU-8/9 board	
2K version for 6800 (6808)	40.00
HUMBUG-09 for 6809	75.00
Other HUMBUG versions including video versions are available. (Specify system)	
Cabinet (heavy gauge, 2 cutouts for 5 1/4" disk drives, drive mount, line cord, line fuse, power switch, reset switch, 70 cfm fan, EMI filter, 6 RS-232 cutouts) and power supply (20a 8v, 4a 16v, 4a -16v), use any current SS-50 or SS-50C motherboard	395.00
Cabinet without power supply	250.00
Power supply (20a 8v, 4a 16v, 4a-16v)	175.00
5" disk regulator board	25.00
Filler plate for 5-1/4" cutout	10.00

MPI 5 1/4" DISK DRIVES with 30 day guarantee and 5 msec stepping rate
Our service department thoroughly tests every MPI drive before we ship

B51 - Single head, single or double density capability, 40 tracks	$250.00
B52 - Double head, single or double density capability, 40 X 2 tracks	335.00
B91 - Single head, single or double density capability, 80 tracks	335.00
B92 - Double head, single or double density capability, 80 X 2 tracks	470.00
MPI - Service Manual	20.00
Dual drive cabinet for 5 1/4" drives with power supply, line cord, fuse, power switch, and power cables to drives	125.00

Dynamite Disassembler	60.00
SUPER SLEUTH Disassembler System	99.00
Microtime 6800 Calendar and Clock Board (assembled and tested)	105.00
Bareboard, connector, and documentation only of above (See review Feb. 1980 '68' Micro Journal)	35.00
Epson Printer (Centronics compatible parallel interface)	495.00
(with Serial RS-232 interface option) add	75.00
Spare Print Head	30.00
Spare ribbon cartridge	15.00

Optimal Technology, Inc. EP-2A-79 Eprom Programmer	169.00
PM-0, PM-1, PM-5, PM-6, PM-7 Personality Modules	each 18.00
PM-2, PM-4	each 34.00
PM-3	26.00
PM-8	36.00

GIMIX (The Ultimate)

6800 CPU Board		224.03
with timers		288.06
with baud rate option	add	30.00
with 2MHz option	add	15.00
2 MHz 6809 Plus CPU, time of day clock, battery backup, 1K NMOS RAM		578.05
CMOS RAM substitution		8.00
GIMIX Dynamic Address Translator		35.00
SWPTC compatible DAT		15.00
9511A Arithmetic Processor (4MHz)		312.00
9512 Arithmetic Processor (3MHz)		265.00
GMXBUG-09 (Terminal Based) 1K scratchpad required		98.65
Boostrap Prom		38.00
Video Prom (includes boostrap)		30.00
Manual and Source Listing only		38.62
Missing cycle detect card		38.23
Disk Controllers (All have data separators and can be used with either single or double headed drives)		
5" single density controller without 1771 chip		158.38
5" single density controller complete		198.48
5" and 8" single density controller complete		226.58
5" double density controller with variable precomp		348.28
DMA 5" AND 8" double density controller with variable precomp		548.68
GIMIX version of FLEX™ (without Editor and Assembler)		90.00
Double disk regulator card		68.22
Ribbon cable for two 5 1/4" disk drives (short)		34.96
Ribbon cable for two 5 1/4" disk drives (long)		39.96
Ribbon cable for two 8" disk drives (long)		44.26
Memory		
32K Static RAM Board with 16K of RAM installed		298.12
32K Static RAM Board with 24K of RAM installed		348.14
32K Static RAM Board with 32K of RAM installed		398.15
64K Static RAM Board with 56K of RAM installed		994.56
64K Static RAM Board with 64K of RAM installed		1088.64
16 Socket EPROM/ROM/RAM Board		238.32
8K Promboard (2708)		98.34
4K PPD 4K Prom Board and 2708 Prom Burner		198.00
I/O Boards		
Single port 30 pin serial interface (Requires 1 cable set)		86.43
Dual port 30 pin serial interface (Requires 2 cable sets)		128.43
8 port 50 pin serial interface with baud rate generator		318.46
Dual port 30 pin parallel interface (Requires 2 cable sets)		86.42
8 port 50 pin parallel interface with interrupt generator		198.45
Cable sets for above boards (specify board)		22.95
Video Boards		
64 or 32 X 16		198.71
80 X 24 without RAM character generator		398.74
80 X 24 with RAM character generator		458.76
High resolution (512 X 512 dot resolution)		996.77
2MHz 6809 PLUS Computer System with 56K Memory		2498.29
Mainframe (Chassis, PS, Switches, Fan, Motherboard, Baud Rate Gen.)		998.19

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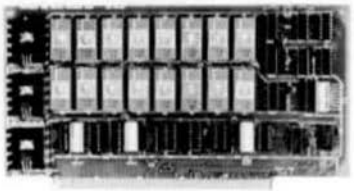
SEE GIMIX AD PAGES 3 & 56

Dealer for GIMIX, SSB, SWTPC, Microware Systems Corp., and Technical Systems Consultants, Inc.

DIGITAL RESEARCH COMPUTERS
(214) 271-3538

32K S-100 EPROM CARD
NEW!



$79.95 KIT

USES 2716's

Blank PC Board - $34

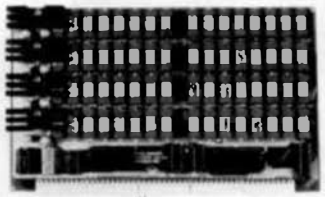
ASSEMBLED & TESTED ADD $30

SPECIAL : 2716 EPROM's (450 NS) Are $9.95 Ea. With Above Kit

KIT FEATURES:
1. Uses +5V only 2716 (2K x 8) EPROM's
2. Allows up to 32K of software on line!
3. IEEE S-100 Compatible
4. Addressable as two independent 16K blocks
5. Cromemco extended or Northstar bank select
6. On board wait state circuitry if needed
7. Any or all EPROM locations can be disabled
8. Double sided PC board, solder-masked, silk-screened
9. Gold plated contact fingers
10. Unselected EPROM's automatically powered down for low power
11. Fully buffered and bypassed
12. Easy and quick to assemble.

32K SS-50 RAM

$299.00 KIT



For 2MHZ Add $10

Blank PC Board $50

For SWTPC 6800 - 6809 Buss

Support IC's and Caps $19.9

Complete Socket Set $21.00

Fully Assembled, Tested, Burned In Add $30

At Last! An affordable 32K Static RAM with full 6809 Capability.

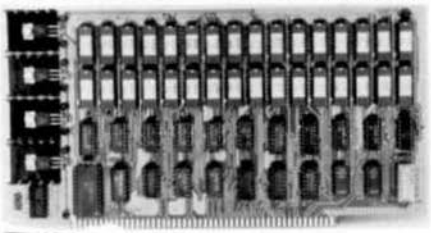
FEATURES:
1. Uses proven low power 2114 Static RAMS.
2. Supports SS50C - EXTENDED ADDRESSING.
3. All parts and sockets included.
4. Dip Switch address select as a 32K block.
5. Extended addressing can be disabled.
6. Works with all existing 6800 SS50 systems.
7. Fully bypassed. PC Board is double sided, plated thru, with silk screen.

16K STATIC RAM KIT-S 100 BUSS

PRICE CUT!

$169.95 KIT

FOR 4MHZ ADD $10



KIT FEATURES:
1. Addressable as four separate 4K Blocks.
2. ON BOARD BANK SELECT circuitry. (Cromemco Standard!). Allows up to 512K on line!
3. Uses 2114 (450NS) 4K Static Rams.
4. ON BOARD SELECTABLE WAIT STATES.
5. Double sided PC Board, with solder mask and silk screened layout. Gold plated contact fingers.
6. All address and data lines fully buffered.
7. Kit includes ALL parts and sockets.
8. PHANTOM is jumpered to PIN 67.
9. LOW POWER: under 1.5 amps TYPICAL from the +8 Volt Buss.
10. Blank PC Board can be populated as any multiple of 4K.

BLANK PC BOARD W/DATA-$33

LOW PROFILE SOCKET SET-$12

SUPPORT IC'S & CAPS-$19.95

ASSEMBLED & TESTED-ADD $35

OUR #1 SELLING RAM BOARD!

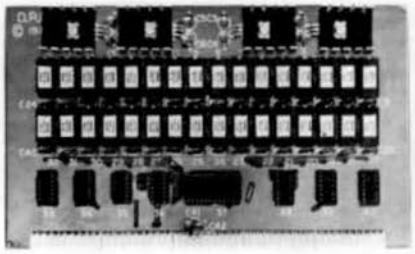
16K STATIC RAM SS-50 BUSS

PRICE CUT!

$159 KIT

FULLY STATIC!

FOR 2MHZ ADD $10



FOR SWTPC 6800 BUSS!

ASSEMBLED AND TESTED - $35

KIT FEATURES
1. Addressable on 16K Boundaries
2. Uses 2114 Static Ram
3. Fully Bypassed
4. Double sided PC Board. Solder mask and silk screened layout
5. All Parts and Sockets included
6. Low Power: Under 1.5 Amps Typical

BLANK PC BOARD—$35 COMPLETE SOCKET SET—$12
SUPPORT IC'S AND CAPS—$19.95

NEW! **STEREO! S-100 SOUND COMPUTER BOARD** NEW!

At last, an S-100 Board that unleashes the full power of two unbelievable General Instruments AY3-8910 NMOS computer sound IC's. Allows you under total computer control to generate an infinite number of special sound effects for games or any other program. Sounds can be called in BASIC, ASSEMBLY LANGUAGE, etc.

COMPLETE KIT! $84.95 (WITH DATA MANUAL)

BLANK PC BOARD W/DATA $31

KIT FEATURES:
- TWO GI SOUND COMPUTER IC'S.
- FOUR PARALLEL I/O PORTS ON BOARD.
- USES ON BOARD AUDIO AMPS OR YOUR STEREO.
- ON BOARD PROTO TYPING AREA.
- ALL SOCKETS, PARTS AND HARDWARE ARE INCLUDED.
- PC BOARD IS SOLDERMASKED, SILK SCREENED, WITH GOLD CONTACTS.
- EASY, QUICK, AND FUN TO BUILD, WITH FULL INSTRUCTIONS.
- USES PROGRAMMED I/O FOR MAXIMUM SYSTEM FLEXIBILITY.

Both Basic and Assembly Language Programming examples are included.

SOFTWARE:
SCL™ is now available! Our Sound Command Language makes writing Sound Effects programs a SNAP! SCL™ also includes routines for Register-Examine-Modify, Memory-Examine-Modify, and Play-Memory. SCL™ is available on CP/M* compatible diskette or 2708 or 2716. Diskette - $24.95. 2708 - $19.95. 2716 - $29.95. Diskette includes the source. EPROM'S are ORG at E000H. (Diskette is 8 inch Soft Sectored)

SPECIAL PURCHASE!

UART SALE!

TR1602B — SAME AS TMS6011, AY5-1013, ETC. 40 PIN DIP

TR1602B

$2.95 EACH **4 FOR $10.00**

CRT CONTROLLER CHIP
SMC #CRT 5037, PROGRAMMABLE FOR 80 x 24, ETC. VERY RARE SURPLUS FIND. WITH PIN OUT. $12.95 EACH.

4K STATIC RAM
National Semi. MM5257. Arranged 4K x 1, +5V, 18 PIN DIP. A Lower Power, Plug in Replacement for TMS 4044, 450 NS. Several Boards on the Market Will Accept These Rams. SUPER SURPLUS PURCHASE! PRIME NEW UNITS!
8 FOR $16 32 FOR $59.95

***NEW!* G.I. COMPUTER SOUND CHIP**
AY3-8910. As featured in July, 1979 BYTE! A fantastically powerful Sound & Music Generator. Perfect for use with any 8 Bit Microprocessor. Contains 3 Tone Channels, Noise Generator, 3 Channels of Amplitude Control, 16 bit Envelope Period Control, 2-8 Bit Parallel I/O, 3 D to A Converters, plus much more! All in one 40 Pin DIP. Super easy interface to the S-100 or other busses. $11.95 PRICE CUT!
SPECIAL OFFER: ~~$14.95~~ each Add $3 for 60 page Data Manual.

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TERMS: Add $2.00 postage. We pay balance. Orders under $15 add 75¢ handling. No C.O.D. We accept Visa and MasterCharge. Tex. Res. add 5% Tax. Foreign orders (except Canada) add 20% P & H. Orders over $50, add 85¢ for insurance.

ALL SALES ARE MADE SUBJECT TO THE TERMS OF OUR 90 DAY LIMITED WARRANTY. A COPY OF THIS WARRANTY IS AVAILABLE FREE, ON REQUEST.

*TRADEMARK OF DIGITAL RESEARCH.

WE ARE NOT ASSOCIATED WITH DIGITAL RESEARCH OF CALIFORNIA, THE SUPPLIERS OF CPM SOFTWARE.

SOFTWARE SYSTEMS AND SOLUTIONS FROM SD

Software Dynamics has been offering quality software for 68xx class machines since 1977. We recognize that our customer's needs grow, and design our software to provide a growth path. SD offers compatible single-user, multi-user, and (soon) network systems to meet this need. Programs that run on the single-user system run unmodified on the multi-user and network systems. A virtual terminal driver assures that screen-oriented applications run on any CRT.

The BASIC compiler is the result of 10 years experience in building BASIC interpreters and compilers. Sequential, random and indexed files are supported, along with true BCD numbers to eliminate conversion errors. Long variable names, blocks for structured programming, and true multi-parameter subroutines and string functions aid program construction and maintenance. Compiled programs are both small and very fast, and the source is completely protected.

SD also offers word processing and accounting software built to the same high standards as its system software.

SDOS™

- Interrupt-driven DOS
- Read-ahead on sequential files
- LRU buffering optimizes random files
- Byte-addressable, device independent files
- Virtual terminal driver handles any CRT
- Command files
- Keyboard typeahead
- Disk file structure validation program
- Adaptable to any 68xx micro with 40kb or more
- Any combination of floppies or hard disk

SDOS/MT™

- Multi-user version of SDOS
- 1 to 8 users
- User space to 60 kilobytes
- Any hardware mapping technology

Structured Design BASIC V1.4

- 32 character variable names
- Line labels
- Parameterized, multi-line functions and subroutines
- Full access to SDOS sequential and random file facilities
- Multi-key indexed file option
- Print using with floating dollar sign
- 10 digit fast decimal floating point (no conversion errors!)
- Binary integer arithmetic
- IF-THEN-ELSE, WHILE-DO, ON ERROR DO
- Many other block structure facilities
- COMMON and program chaining
- Super fast execution
- Very compact compiled code
- Complete error trapping

SDOS is available for the following hardware:

Midwest Scientific Instruments 6800
Pace Technology 480
WaveMate Series 2000
Omnibyte 800, 890
Brittania Computing Models 242, 363, 484, 1010
Motorola Exorcisor™

SEDIT

- What-you-see-is-what-you-get editor
- Uses cursor and arrow keys for positioning
- Insert by typing at cursor location
- Delete by RUBOUT at cursor location
- Edit any size file
- Cut and paste to move text
- Automatic margin wrap
- Tabs
- Very easy to learn

TYPE

- Word or document processing
- Letter and envelope generation
- Form letters with mailing lists
- Complete margin justification
- Centering and underscoring
- Table of contents generation

COUNT/UP

- Full accounting package
- General Ledger, Accounts Receivable, Accounts Payable
- User specifies all report formats
- Account structure and formats changeable at any time

Other programs:

SORT	Sorts records according to any combination of key fields
EDIT	Powerful context editor
fDB	ROMable debugger with single step capabilities
MEMTEST	Thorough memory diagnostic
ASM	6800/6809 assemblers
CHESS	For lighter moments

6809 versions should be available in October, 1981.
BASIC 1.3, ASM and EDIT are available for 6800 FLEX™, SSB DOS or MDOS™.
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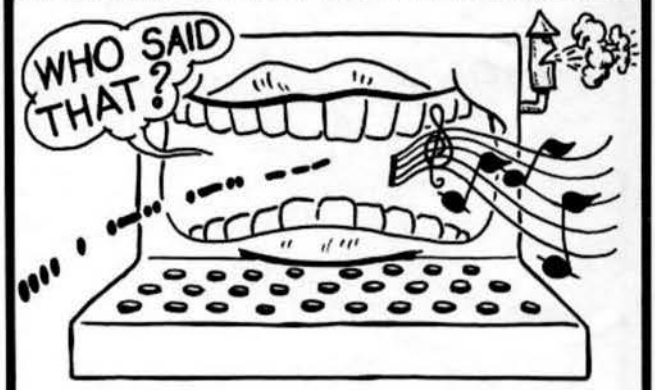

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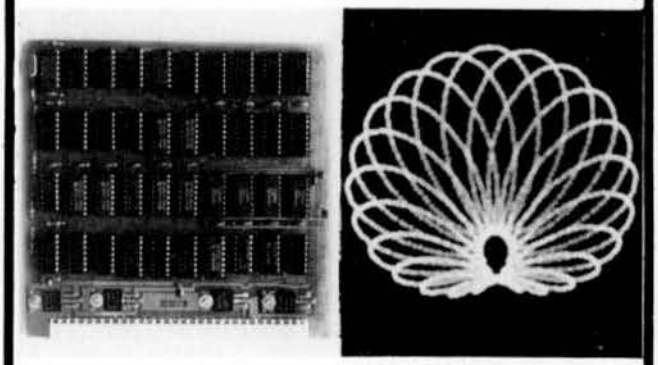

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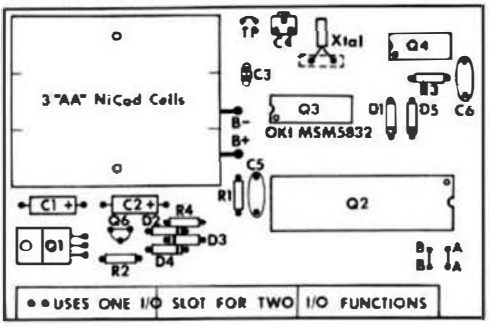

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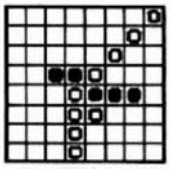

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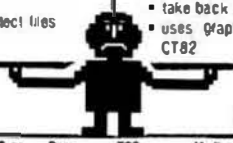

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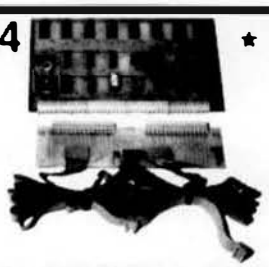

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- *uses low power 2016P-2 (2128) RAM and/or 2716 ROM
- *mix 4K blocks of RAM and ROM
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- *use on SS-50 and SS-50C buss
- *decoded for extended addressing
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Bare Board $49.00 2716 1MHZ $9.95 2016 P-2 2MHZ $16.50

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*Pad spacing permits most standard sockets from 8 to 64 pins	
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(4) 6850 4 serial ports
(1) 6840 3 16 bit counter/timers

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64K BYTE CMOS STATIC RAM BOARD . . . with Battery Back-Up

Using the latest in memory technology, the GIMIX 64K BYTE CMOS STATIC RAM BOARD combines the best features of previous memory boards on one board.

FULLY STATIC MEMORY with its inherent low soft error rate and freedom from alpha-particle induced errors. No complicated refresh timing or clocks required for data retention. Fully compatible with any of the 6800/6809 DMA techniques.

HIGH SPEED 200ns. memorys for guaranteed operation at 2MHz. with no wait states or clock stretching required.

ULTRA-LOW POWER CMOS RAM requires less than 1/4 AMP (250 Ma.) at 8V. for a fully populated 64K BYTE board. Less power supply loading and heat generation for cool, efficient operation.

NON-VOLATILE using an on-board nickel-cadmium battery. The board retains data even with system power removed. With the baltery fully charged, the contents of the memory remain intact for a minimum of 21 days.

HIGH DENSITY permits greater memory expansion to meet the needs of todays sophisticated, multi-user/multi-tasking operating systems.

ADDRESSABLE in two 32K sections that have their own decoding for both the regular and extended (SS-50C) address lines. Each section can be addressed to any 32K boundary in the address range (1M BYTE with extended addressing). The 32K sections are divided into four 8K blocks that can be individually enabled or disabled. Disabled sections do not occupy any address space.

RELIABLE like all GIMIX products, the 64K BYTE CMOS STATIC RAM is designed with reliability in mind. Series damping resistors, a fully gridded power and ground layout, and generous power supply decoupling, all contribute to reliability and data integrity. An unsafe voltage detect circuit inhibits writes to the board, when the 8V. supply falls below a preset level, to prevent loss of data during the transition between system and battery power.

The GIMIX 64K BYTE STATIC RAM BOARD is ideally suited to a wide variety of applications.

Its high density and ultra-low power consumption make it possible to greatly expand systems with a few available bus slots and limited power supply capabilities.

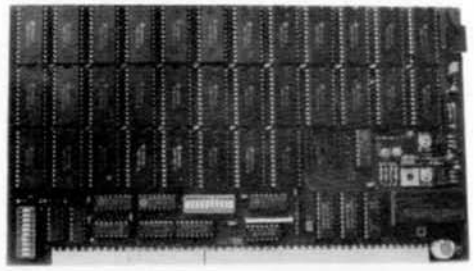
The battery back-up feature is useful where data loss due to power failure cannot be tolerated, or as a replacement for disk or tape storage where conditions such as environment prohibit their use. Since the entire board can be hardware write protected by a switch located at the top of the board, it can also be used to emulate PROM or ROM memory. This is especially useful during firmware developement where frequent software changes must be made.

When the board is used in conjunction with a device such as the GIMIX MISSING CYCLE DETECTOR BOARD, which monitors the A.C. line and generates an interrupt when a power failure occurs, critical data can be stored and system integrity maintained during either expected or unexpected power outages.

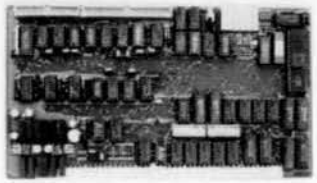
The **GIMIX 64K BYTE STATIC MEMORY BOARD** is available in 56K and 64K versions. Both version include all of the above features; gold bus connectors; and come fully assembled, burned in, and tested.

56K version ..... **$ 994.56**
(Socketed for 64K)

64K version **$1088.64**



GIMIX KNOCKS OUT DISK PROBLEMS



GIMIX DMA DOUBLE DENSITY DISK CONTROLLER #68

The GIMIX DMA (Direct Memory Access) DISK CONTROLLER has the capabilities needed to realize the full potential of todays sophisticated multi-user/multi-tasking operating systems such as OS-9™ and UniFLEX™.

HIGH SPEED using bi-polar logic DMA circuitry for guaranteed operation at 2MHz. DMA transfers take place at full bus speed using 6809 cycle steal DMA. Once the required parameters are passed to the controller and DMA transfer is initiated the processor is free for other tasks. Interrupts can be generated to indicate the completion of the transfer.

SINGLE AND DOUBLE DENSITY data storage on any combination of 5¼" and 8" floppy disk drives; single and double headed, single and double track density, up to 4 drives total.

LOW ERROR RATES are insured by a phase lock data recovery circuit (data separation) and adjustable write precompensation circuitry for drives that require precomp. Separate precomp adjustments are provided for 5¼" and 8" drives.

ADDRESSABLE to any 8 byte boundary in the address space (1M byte when extended address decoding is used). The board occupies only 8 bytes of address space.

EXTENDED ADDRESSING control using the SS-50C extended address lines. Control of the extended address lines allows the board to perform DMA transfers to and from any address in the 1M byte address space.

FULLY BUFFERED with separate 5¼" and 8" output buffers and schmidt trigger input buffers for the disk drive signals.

The DMA controller leaves the processor free to perform other tasks once the transfer is initiated, unlike programmed I/O disk controllers which require the full time use of the processor during data transfers to and from disk.

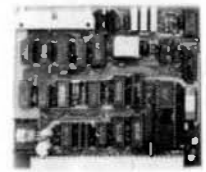
This is extremely important on a multi-user/multi-tasking environment as the processor can perform other tasks such as console I/O while a disk transfer is in progress.

#68 fully assembled, burn -in, and tested $548.68

GIMIX DOUBLE DENSITY PIO DISK CONTROLLER #28

The GIMIX DOUBLE DENSITY PIO (PROGRAMMED I/O) DISK CONTROLLER is a versatile floppy disk interface for use in 6809 systems on the SS-50 or SS-50C bus. The board physically occupies one slot of the 30 pin I/O bus.

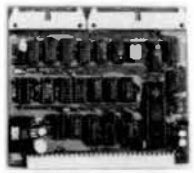
- Double the unformatted storage capacity of single density controllers
- Single and double density operation
- Phase lock data recovery circuit (data separation)
- Adjustable write precompensation (precomp)
- Controls up to four 5¼" drives
- Controls single and double headed drives
- Designed to meet the data hold-time requirements of the Western Digital 1797 floppy disk controller I.C.



The GIMIX DOUBLE DENSITY PIO DISK CONTROLLER is ideal for systems that require greater data storage than that provided by single density controllers, without increasing the number or type of drives. In most cases existing 6809 systems can be upgraded by adding only the controller and the appropriate operating system software.

#28 fully assembled, burned in and tested $348.26

GIMIX 5/8 DISK CONTROLLER BOARD #58



The GIMIX 5/8 DISK CONTROLLER is a versatile floppy disk interface for use with both 6800 and 6809 systems on the SS-50 or SS-50C bus. The board physically occupies one slot of the 30 pin I/O bus.

- Hardware and software compatible with existing disk controllers (SWTPc DC-1, DC-2 and DC-3)
- Controls up to four 5¼" drives in 6800 systems
- Controls any mix of 5¼" and 8" drives, up to four drives total, in 6809 systems
- Provides for double headed drives
- Synchronous data separator for data reliability
- Designed to meet the data hold-time requirements of the 1771 floppy disk controller I.C.

The GIMIX 5/8 DISK CONTROLLER is ideal for a variety of applications including the conversion of computers or existing systems. As a replacement it can provide the added advantage of a data separator, double headed drive operation, and in 6809 systems the ability to use 8" drives. Double headed drives and 8" operation may require appropriate operating system software.

#58 fully assembled, burned in, and tested $226.58

NOTE: When ordering disk controllers please specify the make and model of the drives being used.

GIMIX 6809 FLEX™

GIMIX™ versions of TECHNICAL SYSTEMS CONSULTANTS' 6809 FLEX™ specify controller and type of drive: 8", or 5¼" 40 track (48TPI) or 80 track (96TPI) **$90.00**

GIMIX versions of Technical Systems Consultants 6809 FLEX™ operating system are available for all three GIMIX disk controllers. They fully support all the features of each controller and are software compatible with other versions of FLEX™. GIMIX FLEX™ includes a disk FORMAT program that allows the user to pick the number of tracks to format, single or double sided disks, and where appropriate single or double density. GIMIX FLEX™ supports single and double track density (48 and 96 TPI) 5¼" drives and allows 96 TPI (80 track) drives to read, write, or format 48 TPI (35 or 40 track) disks.

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The MX-70 prints unidirectionally at 80 CPS with a user-defined choice of 40 double-width characters or 80-column printing. It gives you top of form recognition, programmable line feed and form lengths, an easy-to-read 5x7 matrix, self test, and an adjustable tractor feed. And because it's a true impact printer, it doesn't need costly aluminized or thermal paper; plain paper is just fine.

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